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ON BISMUTH SUBNITRATE.

By Simon E. Wolf, Ph.G.[1]

Having learned that in a post-mortem examination bismuth subnitrate had been found in the stomach in an unchanged state, except that the particles had become covered with a thin coating of bismuth sulphide, several commercial samples of the subnitrate were examined microscopically and found to be, some of them distinctly crystalline, others amorphous. This induced an inquiry into the conditions under which bismuth subnitrate may be obtained in different forms; the results show that the precipitation of the salt is influenced by the temperature, the amount of the precipitating liquid, the manner in which the latter is added, and by its composition. It appears that analogous salts, especially the nitrates, interfere with the precipitation of the subnitrate and enable solutions of bismuth nitrate to be diluted with much larger volumes of water than when these salts are absent. For all the experiments the same solution was used, prepared by dissolving 30 gm. of bismuth subnitrate in 30 cc. of nitric acid with the aid of heat, and adding sufficient distilled water to make the solution measure 150 cubic centimeters.

Effects of Temperature.—The precipitating liquid was heated to 100°C., and 2 cc. of the solution added to it, when—

1. With 10 cc. of distilled water distinct prismatic crystals were obtained.

2. With 80 cc. of water the precipitate was amorphous.

3. With 40 cc. of water acidulated with hydrochloric acid (quantity?) no precipitate was produced.

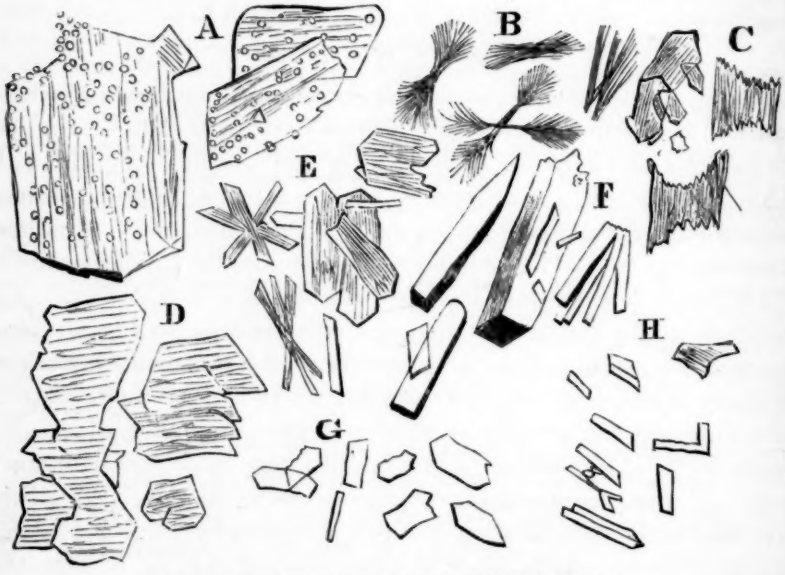
[1] The author, who graduated from the Philadelphia College of Pharmacy in March, died at Harrisburg, Pa., May 29, 1882. The above essay is a brief abstract, prepared from his graduating thesis, which contains eight carefully executed microscopic drawings from which a selection for the accompanying wood cut has been made. - Editor Am. Jour. Pharm.

Modes of Addition.—2 cc. of the solution added to 10 cc. of cold water produced—

4. On slow addition a fine crystalline precipitate.

5. On rapid addition with constant stirring, a crystalline precipitate, as illustrated in A.

6. Water was added, drop by drop, to 2 cc. of the solution, until the precipitate ceased to be redissolved; 11 cc. of water were required.



BISMUTH SUBNITRATE, magnified 120 ×.

A, from little cold water; B, in presence of KNO_3; C, in presence of $Hg_2(NO_3)_2$; D, in presence of $Ni(NO_3)_2$; E, in presence of $Pb(NO_3)_2$; F, from much cold water; G,H, commercial samples, elutriated.

Presence of Nitrates.—The liquid used for precipitating 2 cc. of the bismuth solution consisted of 10 cc. of strong solutions of the following nitrates:

7. Ammonium nitrate; no precipitate after 24 hours.

8. Potassium nitrate; feathery crystals, illustrated in B.

9. Barium nitrate; fine mica-like scales.

10. Sodium nitrate; amorphous precipitate.

11. Silver nitrate; no precipitate.

12. Mercurous nitrate; crystalline precipitate, shown in C.

13. Nickel nitrate; precipitate after 24 hours, crystals like D.

14 and 15. Calcium and magnesium nitrates; no precipitates.

16. Lead nitrate; crystalline precipitate, shown in E.

Presence of other Salts.—2 cc. of the bismuth solution added to 10 cc. of strong solutions of the following salts:

17. Calcium chloride; 18. Sodium sulphate; 19. Manganese chloride; 20. Citric acid; no precipitates.

20. Sodium thiosulphate; black precipitate, probably due to reducing action.

21. Potassium acetate; copious amorphous precipitate.

22. Sodium chlorate; amorphous precipitate.

Various Menstruums.—2 cc. of the bismuth solution added to the liquids, of which 10 cc. were used, except where otherwise stated.

23. Water 2 cc.; no precipitate. See also experiments 1, 2, 3.

24. Water 100 cc.; after 24 hours prismatic crystals, F.

25. Glycerin; no precipitate,—added to 100 cc. water; no change.

26. Glycerin 10 cc. and water 100 cc. mixed; no precipitate.

27. Syrup; no precipitate.

The appearance of commercial bismuth sub-nitrate after elutriation is shown under G and H.

Quantitative Results.—10 cc. of the solution were precipitated, first with 50 cc. cold water; secondly with 50 cc. boiling water, and thirdly with 500 cc. cold water; the precipitates were dried in an air-bath, weighed, then ignited and again weighed. A sample of bismuth sub-nitrate IV, prepared strictly in accordance with the Pharmacopœia of 1870, was examined in like manner. The results were as follows:

	I.	II.	III.	IV.
Weight of precipitate,	1·0 gm.	1·05 gm.	·396 gm.	1·0 gm.
Weight of oxide,	·753 gm.	·855 gm.	·329 gm.	·865 gm.
Percentage of oxide,	75·3	81·4	83·3	86·5

The formula $BiONO_3$ indicates 81·2 per cent. Bi_2O_3, and the formula $BiONO_3H_2O$=76·47 per cent. of oxide, obtainable by ignition.

The leaves of Gossypium barbadense, according to Anderson, are used in Jamaica as a galactagogue, in the form of infusion, 6 or 8 leaves being used to the teacupful. The taste of the infusion is not unpleasant, and may be improved by the addition of milk and sugar. According to the effect produced, four teacupfuls or more are taken in 24 hours.—*Arch. d. Phar.*, Oct., 1882, p. 762; *Allg. Med. C. Ztg.*

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

A new Method of Testing Butter for Foreign Fats. By T. Taylor.—A piece of pure butter, to which two drops of sulphuric acid are added, gives a whitish yellow, untransparent liquid, in which, after about five minutes, a very pale scarlet-red coloration begins to appear at the edges. Fresh oleomargarin from beef tallow gives immediately a transparent, amber-colored liquid, which, after twenty minutes, appears of a deep carmine-red color; with old and rancid oleomargarin, the liquid becomes dark-brown and untransparent. Plant fats, as, for instance, cocoanut oil, give a pale amber-colored liquid, which, in about thirty minutes, assumes a pale red color, readily changing to violet.—*Chem. Zeitung*, No. 34, 1882, from *Biedermann's C.-Bl.*, ii, 345.

On the Detection of Artificial Butter. By P. Casamajor.—The author brings a specimen of the butter, previously melted and freed from any deposit or scum, into alcohol of a definite specific gravity, and observes whether the fat sinks, floats upon the surface, or remains suspended in the liquid. In the latter case the fat has the same specific gravity as the respective alcohol. Pure butter remains suspended at 15°C. (59°F.) in alcohol of the specific gravity 0·926, corresponding to 53·7 per cent. Fat and beef tallow on the contrary are borne by alcohol of the specific gravity 0·915, corresponding to 59·2 per cent. In the examination of a mixed butter it is therefore necessary to form a liquid, by the addition of a specifically heavier or lighter alcohol, in which the specimen just floats. From the strength of the alcoholic mixture a conclusion may be drawn as to the percentage amount of artificial butter in the mixed butter.—*Ibid.*, from *Ibid.*, p. 344.

The Estimation of Neutral Fat in Mixtures of Fatty Acids. By M. Gröger.—O. Hausamann has directed attention to the fact that when an alcoholic solution of potassium hydrate is added, drop by drop, to an alcoholic solution of a mixture of free fatty acid and neutral fat, only the former becomes saponified, while the latter remains unchanged. The author has confirmed in general the correctness of this statement. He dissolved to this purpose neutral beef tallow in boiling alcohol, added a few drops of an alcoholic phenolphtalein solution and 0·1 cubic centimeter of one-half normal alcoholic potassa solution; the solution became immediately red, and the color was retained, even at the boiling temperature, for about five minutes, from which it may be seen that the saponification indeed proceeds very slowly. The author, therefore, proceeds for the separation of the fatty acid from the neutral fat in the

following manner: From 4 to 8 grams of the fatty acid mixture to be tested, according to the greater or less amount of neutral fat, are dissolved by the aid of heat, in a flask of about 300 cubic centimeters capacity, in 50 cubic centimeters of strong alcohol; after the addition of a few drops of phenolphtalein solution, alcoholic one-half normal alkali solution is added from a burette until the red color no longer immediately disappears upon agitation, and the solution is then diluted with 150 cubic centimeters of water. An alcohol is thus formed of from 20 to 25 per cent., in which the neutral fats are practically insoluble, while the potassium soaps dissolve to a perfectly clear liquid. After cooling, 60 to 100 cubic centimeters of ether are added, the flask closed with a cork, and actively agitated, and then allowed to repose until the soap solution below the etherial layer has become perfectly clear. The larger portion of the clear soap solution is then removed from the flask by means of a pipette, with the precaution not to remove the supernatant etherial layer, subsequently largely diluted with water and heated to boiling until the ether and alcohol have become perfectly dissipated. The fatty acids are afterwards liberated by means of dilute sulphuric and hydrochloric acids, and when they have become perfectly separated as an oily layer they are washed with hot water until the latter no longer shows an acid reaction, and afterwards allowed to cool. If the fatty acids solidify to a compact mass this is removed without consideration of the portions that remain attached to the sides of the vessel; if, however, the fatty acids remain liquid the larger part is removed by means of a pipette. The equivalent weight, or the weight which is exactly saponified by 1 liter of normal alkali, is now determined, after the fatty acids have been previously carefully dried; one-half normal alcoholic potassa solution being applied in the process of filtration.

The number of cubic centimeters of normal alkali required for the neutralization of the free fatty acids in the normal mixture of fats, multiplied by the thousandth part of the equivalent weight thus found, gives the amount of the therein contained fatty acids, and therewith also the amount of the admixed neutral fat.—*Ibid.*, from *Dingl. Polyt. Jour.*, 244, p. 303.

A new Method of Detecting and Removing the Impurities of Chloroform. By Ivon.—Potassium permanganate is reduced by impure, but not by pure chloroform. A solution of 1 gram of potassium permanganate in 10 grams of an alcoholic potassa solution and 250 grams of water, which possesses a beautiful violet color, assumes immediately

upon the addition of impure chloroform a green color. The liquid then becomes colorless and oxide of maganese is separated. The author purifies the chloroform by dissolving potassium permanganate in the smallest possible quantity of water, adding 20 grams of caustic potassa, and mixing this solution in a large bottle with the chloroform, which is agitated from time to time. After some hours it is decanted, and a new solution added until, even after standing for some hours, the red color remains permanent. The chloroform is then poured off, deprived of water by means of potassium carbonate, and distilled.—*Ibid.*, from *Giorn. Farm. Chim.*, 31, p. 193.

A new Reaction of Narceine. By C. Arnold.—Upon warming a trace of narceine with a mixture of equal parts of concentrated sulphuric acid and phenol a yellow, and then a brownish color is obtained, which, when the phenol begins to volatilize assumes a fine cherry red, permanent upon continued heating, and, upon the addition of a few drops of water becomes of a dirty whitish-yellow. Veratrine, when treated in the same way, gives the cherry-red coloration as with sulphuric acid alone, resembling very much that of narceine, but upon the addition of water becoming of a canary-yellow color. Codeine becomes at first of a dirty reddish-violet, and upon warming, of a dirty-brown. Delphinine at first brick-red, and upon warming, red-brown. The reactions of the sulphuric acid-phenol mixture with other alkaloids are not very characteristic.—*Ibid.*, No. 47, 1882, from *Rep. an. Ch.*, 2, p. 229.

Estimation of Morphine in Opium.—The Paris Society of Pharmacy has agreed upon the following method for the valuation of opium: 15 grams of the opium to be tested are intimately mixed with 9 grams of calcium hydrate, 150 cubic centimeters of water gradually added with continued trituration, and the mixture occasionally agitated for half an hour. The mixture is then poured upon a filter, and exactly 100 cubic centimeters of the filtrate brought into a stoppered glass vessel. Twenty cubic centimeters of ether are now added and agitated, and, after dissolving 6 grams of powdered chloride of ammonium in the liquid, it is allowed to repose for two hours. The ether is then decanted, replaced by a fresh portion, and after repeated agitation again decanted. The precipitate of morphine is finally collected upon a smooth filter, washed with a few cubic centimeters of cold, distilled water, dried and weighed. The weight of the dried precipitate, after deducting the weight of the filter, when multiplied by 10, represents the percentage amount of morphine in the opium.—*Phar. Zeitung*, No. 60, 1882, from *Jour. de Pharm. d'Alsace-Lorraine.*

HUFNER'S REACTION WITH BULLOCK'S BILE AND SOME PROPERTIES OF GLYCOCHOLIC ACID.

By F. Emich.

While preparing glycocholic acid by mixing bile with ether and hydrochloric acid (Hüfner's method), the author observed that some biles only deposited the acid after several days; he has therefore further investigated the subject, with the following results. Of several samples of Graz galls, 50 per cent. gave the reaction in the first hour, 15 per cent. within a week, while the remainder did not show it at all. From an examination of 14 samples he infers that—1. The quantity of glycocholic acid which separates out is inversely as the time of of crystallization, *i. e.*, the quicker the crystallization the larger the yield, etc. 2. Benzene is better than ether; with benzene and hydrochloric acid the separation takes place more quickly, is more copious, and is even produced in those biles which give no precipitate with ether. 3. Cow bile gives crystals more frequently than ox bile, as Hüfner has already remarked. For a more complete examination of the biles he divides them into two classes; those which crystallize within half an hour he calls "crystallizing biles," and those which do not do so within 24 hours are called "non-crystallizing biles." In outward appearance and density they are alike. The following are the results of the quantitative examination of the two classes of bile:

Constituent.	Crystallized bile.	Non-crystallized bile.	Remarks.
Water	92·44	91·42	Loss at 105°C.
Sodium glycocholate.	3·12	0·69	Calculated from the lead salt precipitate.
	3·00	.....	Calculated from Hüfner's reaction precipitate.
Sodium taurocholate.	2·81	5·40	Calculated from sulphur found.
Mucin	0·24	0·22	Alcoholic extract, less ash of ext.
Inorganic salts	0·64	0·68	From ash after extraction of the bile acid salts.

The only important difference between the two classes of bile is therefore in the proportion of the glycocholic and taurocholic acids. The author therefore assigns as a reason for the non-crystallizing biles not showing Hüfner's reaction that they contain no more or very

little more glycocholic acid than can be dissolved by the taurocholic acid set free on the addition of acid.

Solubility of Glycocholic Acid.

In water—						
Temperature of water	20°		60°		80°	100°
Glycocholic acid dissolved (per cent.)	0·033		0·102		0·235	0·85
In alcohol—						
Strength of alcohol (per cent.)	1	2	10	20	30	50
Acid dissolved (per cent.)	0·035	0·049	0·10	0·275	1·674	27·53
In taurocholic acid—						
Strength of solution employed (per cent.)			1	5	10	
Glycocholic acid per cent. dissolved			0·056	0·37	0·69	

Ether, benzene, and chloroform at 20°C. dissolve respectively 0·093, 0·009, and 0·011 per cent. of glycocholic acid.

Strecker observes ("Handwörterbuch," 2, 1192) that glycocholic acid melts above 100°, giving off water and forming glycocholonic acid. The author finds the melting point always constant at 132 to 134°, but has not remarked the loss of 3·9 per cent. (1 mol.) of water necessary for the above change. At 100 to 115° the loss in weight is insignificant; at 140 to 150°, after eight hours, it is 2·6 per cent.; at 160 to 170°, after two hours, it is 4·5 per cent. When a saturated solution of pure glycocholic acid is boiled with water for 24 hours, about 22 per cent. is converted into *paraglycocholic acid.* This acid (m. p. 183 to 184°) is nearly insoluble in water; the solution shows no reaction with litmus, and is tasteless, although the acid itself is intensely bitter. The dry substance adheres strongly to glass, and appears to be a very bad conductor of electricity. Titration with soda (the glycocholates are neutral) proves that glycocholic acid is monobasic.—*Jour. Chem. Soc.*, Nov., 1882; from *Manatsh. Chem.*, 3, 325–342.

ESTIMATION OF TANNIN.

By F. Simand.

The author had occasion to make a number of tannin estimations according to Löwenthal's improved method, and found that the percentage of tannin in the same material was subject to certain variations, higher results being obtained when a larger quantity of material was boiled out. A series of experiments was therefore made, the object

being to ascertain the cause of this discrepancy. The analyses were conducted in the following manner: The solution of potassium permanganate contained 1 gram per liter, 1 cc. equal to 0·00135 g. tannin. It is standardized with iron, and the tannin equivalent calculated according to Neubauer's estimations (0·063 g. oxalic acid = 0·04157[1] g. tannin). The indigo solution is prepared so that 20 cc. require 18 to 20 cc. of the solution of potassium permanganate. In titrating the tannin infusion the author invariably used 20 cc. of indigo solution, the advantage being that the liquid to be titrated gives the same yellow color in each case, so that the eye gradually becomes accustomed to it. The gelatin solution is made according to Löwenthal's prescription, the filtration, however, is conducted according to Kathreiner's method. In preparing the infusion the quantity of tannin should be regulated so that 10 cc. of the solution require 12 cc. of potassium permanganate. Although it is unnecessary to adhere strictly to this strength, it is important to consider the quantity of tannin taken, and not to use too small a quantity, in which case the above-mentioned error would be multiplied. Again, it is not advisable to have the infusion in too concentrated a state, as the oxidation-products of the organic substances affect the yellow color very considerably and hinder the recognition of the end reaction. In order to ascertain whether the extraction has been complete ferric oxide paper is used, *i. e.*, strips of filter-paper are steeped in a solution of 1 gram ferric chloride, and 1 gram sodium acetate in 100 cc. water, and dried in the air. This paper gives a distinctly visible black stain with a solution containing 1 part of tannin in 10,000 water. With a smaller quantity, a black ring is produced round the drop of the solution poured on filter-paper. The acidulated water used contains in 100 cc. 3·786 g. H_2SO_4.

The analysis is made as follows: 10 cc. of the infusion are treated in a shallow porcelain basin with 1 liter of water and 20 cc. indigo solution. Potassium permanganate is then added slowly drop by drop until a yellow color with faint reddish tinge is produced. To determine the oxidizable "non-tannin" constituents the tannin in 50 cc. of the infusion is precipitated with 50 cc. of gelatin solution saturated with salt, and 25 cc. acidulated water. After shaking up and allowing to stand for some time the mixture is filtered. 25 cc. of the clear filtrate (corresponding to 10 cc. infusion) are then treated with 1 liter

[1] According to Councler and Schroeder the correct equivalent is 0·03425 to 0·03430 gm.—*Berichte*, 1882, p. 1373.

of water and 20 cc. indigo solution, and titrated with potassium permanganate. By deducting from the quantity of potassium permanganate used in the direct titration the quantity consumed in the second titration the number of cubic centimeters required to oxidize the tannic acid in 10 cc. of infusion is obtained. As the volume corresponding to a certain weight of extracted material is known, and the potassium permanganate value of the tannin has been determined previously, it is easy to calculate the percentage of tannin in the tanning materials, provided that in the gelatin filtrate the "non-tannin" bodies only are titrated. This, however, was found not to be the case. The consumption of potassium permanganate in titrating the gelatin filtrate is mainly due to the solubility of the "gelatin tannate" in dilute sulphuric acid. The author is investigating this point with a view of remedying it.—*Jour. Chem. Soc.*, Nov., 1882; from *Dingl. Polyt. J.*, 244, 303–411.

THE INFLUENCE OF GUM ARABIC IN CERTAIN CHEMICAL REACTIONS.

By J. Lefort and P. Thibault.

It is known that the presence of certain organic substances in saline solutions may prevent the formation of a large number of precipitates. In this respect the influence of tartaric acid is familiar to chemists. The researches it is proposed to describe warrant the statement that some neutral bodies, and gum arabic in particular, also enjoy this property.

Upon this principle is based the therapeutic employment of soluble sulphide of mercury, as described by M. Lambron in a communication to the French Academy of Medicine. M. Lambron pointed out that when an aqueous solution of bichloride of mercury is added to the sulphuretted Luchon water a precipitate of sulphide of mercury is rapidly formed, which falls to the bottom of the vessel as a black powder. But if, instead of introducing the bichloride of mercury directly, it be previously mixed with syrup of gum or sarsaparilla, beef tea, albumen or apple jelly, and then poured into the Luchon water, in proportion a little in excess of the sulphur strength of the water, no precipitate is formed, even after several weeks of contact. This observation induced M. Lambron to suppose that when bichloride of mercury is dissolved and mixed with gummy and albuminous

substances, and then poured into the sulphuretted Luchon water, the chemical action is suspended, *i. e.*, no sulphide of mercury is formed. The authors believe that although the experiments of M. Lambron may be correct his interpretation is not admissible.

At first it might be supposed that the viscosity of the solution was the cause of the non-precipitation. But this is not the case, for if the syrup of gum be replaced by simple syrup or glycerin a precipitate is formed. It would therefore appear that the prevention of the formation of the precipitate is due to the gum or vegetable extract contained in the precipitate, and this was confirmed by the authors' experiments. The reaction is not peculiar to Luchon water and solutions of sulphuretted hydrogen, or monosulphide of sodium may be substituted without sensibly modifying the results.

The authors therefore thought it would be interesting to ascertain whether gum equally prevented the precipitation of the different metallic sulphides, using solutions suitably diluted. For this purpose a titrated solution of monosulphide of sodium was prepared containing 1·7 gram of sulphydric acid per liter; on the other hand, a certain number of solutions each also containing a corresponding quantity of a metallic salt per liter; finally, a clear solution of 1 part of gum arabic in 2 parts of water. The observations were made in the following manner:

Two quantities of 10 cc. of the solution to be examined were run from a graduated pipette into two glasses of equal volume; with one of these 3 cc. of solution of gum was incorporated by stirring and to the other 3 cc. of distilled water was added; finally 10 cc. of sulphuretted solution was added to each and rapidly mixed. The following table represents what was observed both after a few minutes and some weeks:

	Without Gum.	With Gum.
Lead acetate,	Black precipitate,	Clear brown solution.
Silver nitrate,	Black precipitate,	Clear black solution.
Ferrous sulphate,	Black precipitate,	Clear black solution.
Manganous sulphate,	Rosy flesh-colored precipitate.	Clear light brown solution.
Mercuric chloride,	Black precipitate,	Clear dark brown solution.
Copper sulphate,	Black precipitate,	Clear dark brown solution.
Zinc sulphate,	White precipitate,	Clear colorless solution.
Antimonous chloride in solution acidified by HCl.	Orange precipitate,	Clear orange solution.
Arsenous acid,	Citron-yellow precipitate.	Clear citron-yellow solution.

It will be seen, therefore, that under the conditions stated gum prevented the precipitation of metallic sulphides. In concentrated solutions, or when the proportion of gum was very small, more or less incomplete precipitations were observed.

It next appeared interesting to ascertain whether gum has also the power to stop the precipitation of metallic oxides and of alkaloids by the ordinary reagents. The following were the results obtained.

As to the metallic oxides it is unnecessary to enter into details of the experiments, it will be sufficient to say that they behaved like the sulphides in the presence of solution of gum. But since the oxides are, as a rule, much more soluble in water than the corresponding sulphides, metallic solutions of double the strength were used, and a corresponding solution of caustic soda.

The action of gum upon the formation of certain other precipitates was also studied, the following being the results observed:

	With Gum.	Without Gum.
Neutral phosphate of ammonia and calcium chloride.	White gelatinous precipitate.	Clear colorless solution.
Uranium nitrate and potassium ferrocyanide.	Chocolate-brown precipitate.	Clear brown solution.
Very dilute solution of ferric chloride and ammonia.	Brown gelatinous precipitate.	Clear light brown solution.

In a like manner no precipitates were produced in the presence of gum in solutions of 1 in 1,000 of the following alkaloids: quinine, cinchonine, morphia, strychnia, brucia and veratria, by the usual alkaloidal reagents—phosphomolybdate of ammonia, double iodide of mercury and potassium and tannin. If it be remembered that the separation of alkaloids by their reagents has to be effected in the presence of various organic matters that accompany them either naturally or accidentally, these researches acquire for toxicology an unmistakable importance.

It is necessary also to note that certain vegetable infusions—among others that of tea—are opposed to the precipitation of sulphide of mercury. The liquid only acquires a darker color, consequent upon the presence of sulphide of mercury formed; this, however, is the same as happens with gum solutions.

Notwithstanding the numerous instances that have been quoted, the

non-precipitation of dilute solutions in the presence of gum is not absolutely general. The iodides of lead and mercury, sulphate of barium and carbonate of lead are precipitated in solutions containing gum more slowly, but nearly as completely as in distilled water.

The question arises whether in the presence of these facts it is necessary to conclude that the ordinary reactions undergo modification. Contrary to the opinion of M. Lambron, the authors think it is not. Although precipitation does not take place, it is evident from the intense coloration of most of the gummy liquids, as compared with that of the liquids floating above the precipitates, that the compounds are formed, but that they remain, if not in solution, at least in such a state of division that they pass through any filter; and the microscope, even with the strongest powers, does not reveal any trace of solid matter in suspension. Under these conditions it might be asked whether gum does not possess the property of dissolving metallic sulphides and oxides. Such an interpretation would be inexact, because recently formed precipitates are not redissolved when submitted to the action of a very concentrated solution of gum.

Although the phenomenon has not the generality that might be expected, the authors publish these results as affecting not only therapeutics, but also analytical chemistry and toxicology. It is alo suggested that they are worthy of the attention of physiologists, since most of the organic liquids contain gum or analogous substances, and it is therefore possible to conceive the simultaneous existence in the soluble state in animal or vegetable cells of compounds reacting chemically upon each other.—*Phar. Jour. and Trans.*, Oct. 14, 1882, from *Jour. de Phar. et de Chim.* [5], vi, 169.

CONTRIBUTIONS TO THE STUDY OF ANTISEPTICS.

By F. Boillat.

Koch having declared in a recent paper that most of the substances at present employed at disinfectants are practically useless, and that the only ones worthy of the name are chlorine, bromine, iodine, and corrosive sublimate, with possibly potassium permanganate and osmic acid, the author undertook the investigations recorded in this paper; he thinks that this contradiction of generally accepted facts is not as strong as it appears. As the antiseptics employed in surgery do not require to be perfect, it is sufficient for the purpose of the surgeon if

the propagation of the organisms is arrested for a time long enough to allow the wound to heal. The spores by which some of the bacteria are propagated bear much analogy to the eggs of certain animals and the seeds of certain plants which preserve their vitality under very severe conditions, some of them not being killed even by weak acids. The classification of bacteria, according to their resistance to the action of antiseptics, has been commenced and carried to an advanced stage by Koch; the spores of the splenic fever organism preserve their vitality for many days in a 1 per cent. aqueous solution of phenol, or a 5 per cent. solution of zinc chloride, but their development is arrested; this suffices for medical purposes, as although chlorine, etc., would effectually destroy them, they would also severely injure the patient to whose wounds they might be applied.

Most antiseptics form permanent insoluble compounds with albumin, for example, egg albumin treated with a dilute solution of zinc sulphate or chloride forms Lieberkühn's zinc albuminate having the composition $C_{72}H_{112}N_{18}SO_{22} + ZnO_2H_2$: similar reactions occur with the other substances named by Koch, and would also occur when applied to wounds.

Samples of blood serum and egg albumin, diluted with three or four times their weight of water, were precipitated with solutions of phenol, zinc chloride, copper sulphate, corrosive sublimate, etc.—the precipitate thrown on a filter, washed until the wash-water was free from traces of the reagent, 2 or 3 grams of the damp substance was then beaten with water to a thin paste, and allowed to remain at the ordinary temperature, loosely covered with a bell-glass; watch-glasses containing serum and Koch's nutritive gelatin, without any additions, served to control the experiments, which were divided into three series —in the first the substances were left to the action of floating germs in the air. The control samples were infected in 24 hours, and became putrid in 2 to 4 days, but the other samples remained sound from 6 up to 60 days in the case of the mercury albuminate. In the second series the samples were sown with cocci, found on an infusion of coffee, and the third with splenic fever germs; in both of them the unprotected samples showed a remarkable increase of germs within the space of 2 days.

The albumin precipitated by phenol became putrid in 48 hours; the sample on being distilled with water showed no trace of phenol on adding bromine, the washing having removed it. This experiment

was therefore a failure. Copper, zinc and mercury albuminate remained for 4 weeks without perceptible change, and the author believes they would remain so for an unlimited period were oxygen and water absent.

Other experiments made with such materials as iodoform, carbon dichloride, tetrachloride, and hexachloride, solid and liquid bromotoluene, which have been favorably noticed in medical journals, were unsuccessful, and the author believes them useless as antiseptics.—*Jour. Chem. Soc.*, Nov., 1882; from *J. pr. Chem.* [2], 25, 300–309.

THE EXAMINATION OF BALSAM OF PERU.

By O. Schlickum.

The author reports the results of a number of experiments having for their object the facilitating of the examination of balsam of Peru for adulterants and the quantitative determination of these when present. As materials he used five guarantee samples of balsam obtained at different times from different sources. The possible adulterants particularly investigated were castor oil, copaiba balsam, purified storax, an alcoholic solution of benzoin brought to the consistence of a balsam, and a similar solution of colophony. Before proceeding to methods of investigation the author makes the following remarks on the specific gravity and the free acids of Peru balsam.

The specific gravity is a very important criterion of unsophisticated balsam. All the other substances above mentioned possess a lower specific gravity than the true Peru balsam. The highest of the five specimens examined by the author was 1·148 and the lowest 1·142. Any sample of Peru balsam having a specific gravity lower than 1·135 may therefore be regarded as adulterated. The specific gravity of castor oil and of copaiba balsam is in each case under 1·00, that of the former varying between 0·95 and 0·97, and that of the latter between 0·94 and 0·99. The specific gravity of the purified storax, which was obtained as a brown transparent balsam by extracting liquid storax with alcoholic ether and evaporating the clear filtrate, was determined as 1·090; that of the colophony solution as 1·016; and that of the benzoin solution as 1·080. These are all considerably below the specific gravity of the true Peru balsam, so that an addition of one of them would markedly lower its specific gravity. For instance, an

addition of 15 per cent. of benzoin solution to Peru balsam, specific gravity 1·146, lowered the specific gravity to 1·135. The author prefers to use the pycnometer in determining the specific gravity of the balsam. The plan recommended by Hager, of observing whether a drop of balsam floats or sinks in a saline solution of known density, he considers to be defective, as the behavior of the drop is affected by the conditions under which it reaches the surface of the solution.

The author does not consider that the estimation of the free acid constitutes such a good criterion as the specific gravity. The five genuine samples of Peru balsam required from 5·1 to 7·2 per cent. of soda crystals for their exact neutralization. The purified storax corresponded to 4·5 to 5·1 per cent.; the copaiba balsam to 5·1 per cent.; the colophony solution to 7·5 per cent.; the benzoin solution to 14 per cent. of soda; only the castor oil was devoid of free acid. The estimation of free acid would therefore only be of use in conjunction with other tests, chiefly in the determination of admixture with benzoin or castor oil, the former increasing and the latter diminishing the acidity.

A. Behavior of Balsam of Peru towards Solvents.—(1). Spirit of wine dissolves half its weight of Peru balsam almost clear; a further addition of spirit, however, renders the solution turbid, through separation of a small quantity of resin. Ether behaves similarly; it mixes clear with an equal quantity of balsam, but the solution becomes turbid upon the addition of more ether, resin separating equal to about 6 per cent. of the Peru balsam.

As ether and alcohol easily form clear solutions with both castor oil and the colophony solution, they do not furnish a means for detecting admixtures of these substances. Purified storax and copaiba balsam give with alcohol very turbid and with ether clear solutions; benzoin solution mixes clear with alcohol, and turbid with ether, about 10 per cent of resin separating. Consequently these solvents give no decisive indication of adulteration of Peru balsam with the last three substances.

(2). Carbon bisulphide dissolves Peru balsam with the exception of 11 to 16 per cent. of resin, which adheres so fast to the sides of the vessel that the light colored solution can be poured off clear. Benzoin resin is almost insoluble in carbon bisulphide, giving up only the benzoic acid present, so that carbon bisulphide furnishes a good means for detecting a large admixture of benzoin. The following table shows the behavior of one part of the substance tested in two parts of carbon bisulphide.

One part of	In two parts of Carbon Bisulphide.
Peru balsam,	At most 16 per cent. of resinous residue. The genuine samples varied from 11 to 16 per cent.
Purified storax,	Dissolved completely; clear solution.
Colophony solution,	Entirely soluble; perfectly clear.
Copaiba balsam,	Dissolved completely; quite clear.
Castor oil,	Dissolved completely; quite clear.
Benzoin solution,	60 per cent. of resinous residue.

Consequently if a sample of Peru balsam, when shaken with double its weight of carbon bisulphide, yields more than 16 per cent. of undissolved resinons residue, an admixture of solution of benzoin is probable.

(3). Petroleum spirit takes up from Peru balsam a light yellowish balsam, probably consisting principally of cinnamein (benzyl cinnamate). Upon saponifying this with alcoholic solution of caustic soda, besides sodium cinnamate, benzyl alcohol is obtained, easily recognized by its intense hyacinth odor. By repeatedly shaking Peru balsam with three or four times its quantity of petroleum spirit half of it is dissolved and half remains undissolved. The following shows the relative behavior of the other subtances:

	Shaken with Petroleum Spirit.
Peru balsam,	Half dissolved.
Purified storax,	About one-third dissolved.
Benzoin solution,	Only 12 per cent. dissolved.
Colophony solution,	More than half dissolved (40 per cent of resin).
Copaiba balsam,	All dissolved.
Castor oil,	All dissolved.

Consequently if a sample of balsam gives up more than 50 per cent. to petroleum spirit an admixture of copaiba balsam or castor oil is indicated.

B. Behavior of Peru Balsam towards Caustic Lime.—When Peru balsam is mixed with dried calcic hydrate no saponification or decomposition of the cinnamein contained in it results; neither does it take place if water or alcohol be added. The cinnamein can be extracted from the mixture by means of petroleum spirit, and in a large number of experiments with Peru balsam the proportion was found to remain constant at 41 per cent. of the balsam used. From the residue undissolved by petroleum spirit ether dissolves out about 14 per cent. of styracin, which differs from cinnamein in being difficultly soluble in cold alcohol, and in yielding upon saponification with alcoholic soda solution not benzyl alcohol, but cinnamyl alcohol, together with sodium cinnamate.

Purified storax behaves similarly, but gives up somewhat less cinnamein to petroleum spirit and about as much more styracin to ether. Colophony and benzoin solutions, when macerated with calcic hydrate, combine with it so that petroleum spirit extracts scarcely anything from the mass. On the other hand, castor oil can be completely removed with petroleum spirit as long as there has been no addition of water; but if castor oil be digested in a water bath for several hours with calcic hydrate and successive additions of water, saponification takes place, and petroleum spirit no longer dissolves out oil from the mass. Copaiba balsam behaves similarly, its resin eventually combining with the lime, after which petroleum spirit only dissolves out the essential oil of the balsam.

After several hours' digestion with caustic lime and water petroleum spirit removes from—

Peru balsam,	41 per cent.
Purified storax,	35 per cent.
Copaiba balsam,	Its essential oil.
Castor oil,	Almost nothing.
Benzoin solution,	Almost nothing.
Colophony solution,	Almost nothing.

This method is not very suitable for the recognition of the substances used for sophistication, but it is of great value in their quantitative determination.

C. Behavior of Peru Balsam towards Caustic Ammonia.—When an ethereal solution of Peru balsam is shaken with ammonia solution, sp. gr. 0·960, two yellowish-brown layers are formed, between which brownish flocks swim. The upper layer is the ethereal solution of the balsam, and leaves, when separated and evaporated, about 80 per cent. of the quantity used as a brown balsam. The inconsiderable resinous mass swimming between the two layers adheres partially to the side of the vessel. The lower ammoniacal layer, when separated and rendered acid with acetic acid, shows a whitish turbidity, but becomes almost clear on boiling and again turbid on cooling through separation of cinnamic acid, without, however, forming a solid deposit at the bottom. The ammonia solution withdraws the free cinnamic acid from the balsam, without affecting its other constituents.

Benzoin solution behaves similarly. It gives up to the ethereal layer the greater part of its resin, whilst the watery layer takes up the benzoic acid, and upon supersaturation with acetic acid and boiling becomes only slightly turbid.

Castor oil passes so completely into the upper ethereal layer that the ammoniacal layer, upon being acidified, scarcely separates a single oil globule.

In the case of colophony solution and copaiba balsam the resin combines with the ammonia, so that when the lower layer is rendered acid and boiled, a considerable separation of solid resin takes place.

With purified storax there is scarcely any separation into two layers, but it yields a stiff homogeneous jelly that will hardly flow from the glass.

This holds nearly good for a mixture of equal quantities of Peru balsam and purified storax; if less storax be present there is a separation into layers, but gelatinous lumps are to be seen smimming in the ethereal solution. Whilst also with Peru balsam the lower ammoniacal layer, when separated and supersaturated with acetic acid, appears only slightly turbid upon boiling, the lower liquid layer from a balsam adulterated with copaiba balsam or colophony, when similarly treated, shows a separation of more or less solid resin.

D. Action of Strong Sulphuric Acid on Balsam of Peru.—If Peru balsam be mixed with at least an equal quantity of concentrated sulphuric acid, the mass becomes hot, blackened and thickened. Upon washing it with hot, and afterwards with cold water, it is at first plastic, but after cooling becomes solid and brittle. If it be spread out smooth, dried superficially with blotting paper, crushed and placed in a test tube with several times its quantity of ether, complete solution takes place in a short time. When a small quantity (1 to 2 grams) of Peru balsam is used no smell or frothing or evolution of vapor is observed when the mixing takes place; but with larger quantities these phenomena are manifested, sulphurous acid being set free. When the test is used with the adulterants mentioned, their behavior in small quantities—1 gram—exactly resembles that of genuine Peru balsam; except in the case of copaiba balsam, with which, even in the smallest quantity, there is strong frothing and an evolution of white vapor and sulphurous acid. With colophony, benzoin, storax and castor oil, these appearances are first manifested with a quantity exceeding two grams. Consequently, if frothing and evolution of sulphurous acid commences when the quantity is limited to 1 gram, the presence of copaiba balsam may be concluded.

The washed resinous mass is completely soluble in ether, as before mentioned, so long as it contains neither benzoin nor storax. But if

only a small quantity has been taken for the experiments, so that no reduction of sulphuric acid has taken place (1 gram of balsam and 1 gram concentrated sulphuric acid), a sample containing storax or benzoin yields a mass that when washed and superficially dried is only partially soluble in ether. Upon mixing 1 gram of substance with 1 gram of concentrated sulphuric acid, and subsequently washing with hot and afterwards with cold water, there was obtained with Peru balsam, copaiba balsam, or colophony, a solid brittle mass completely soluble in ether; with purified storax or benzoin a solid brittle mass, only partially soluble in ether; and with castor oil a smeary greasy mass completely soluble in ether.

The smeary property which castor oil imparts to the sulphuric resinous mass indicates with certainty the presence of this oil. In the case of all the other substances the washed residue possessed a plastic or even crumbling character, and became quite hard on cooling.

If the insoluble residue be well washed on a filter with ether and then treated with alcohol any portion of it derived from benzoin dissolves completely. If it owes its origin to storax a small white residue is left, consisting of a substance first observed by the author in 1881 and which E. Mylius has named styrogenin, and represented by the formula $C_{26}H_{40}O_3$. Styrogenin is still better isolated by treating the residue left by ether with acetone, which dissolves any portion of the residue derived from benzoin completely and that from storax all except the styrogenin. Styrogenin is insoluble in water, alcohol, acetone and alkalies, but is easily soluble in chloroform. It can therefore be readily got pure by treating with a little chloroform the white powder left after washing the ether residue with acetone or spirit, and allowing the chloroformic solution to evaporate in a watch glass. The styrogenin is thus obtained in microscopic crystals partly tabular and partly more pointed, but always prismatic.

If larger quantities of storax be used no styrogenin is obtained, since the reduction of the sulphuric acid thus set up involves the decomposition of the storax in other ways. But with quantities not exceeding 1 to 2 grams storax always yielded the author styrogenin. It is also requisite that the quantity of sulphuric acid used should not be less than that of the balsam. Storax yields from 6 to 7 per cent. of styrogenin.

If therefore a sample of Peru balsam treated with sulphuric acid is not entirely soluble in ether, the residue if completely soluble in

acetone or alcohol indicates an adulteration with benzoin; but if a white powder insoluble in acetone or alcohol be left, it shows an adulteration with storax. This powder may then be dissolved in chloroform and left to crystallize.

SCHEME FOR THE QUALITATIVE EXAMINATION OF BALSAM OF PERU.

(1). The specific gravity should be determined. It should never fall below 1·135.

(2). Upon shaking 1 gram of balsam three or four times with several grams of petroleum spirit, not more than ·05 gram should be taken up, so as to be left behind upon evaporation. Otherwise an admixture of castor oil or copaiba balsam would be probable. The latter would be recognizable by the odor of the essential oil.

(3). Dissolve 1 gram of balsam in several grams of carbon bisulphide and estimate the undissolved portion, dried at 140°C. This should not amount to more than 0·16 gram, otherwise an admixture of benzoin is probable.

(4) *a*. Mix 1 gram of balsam with 1 to 1·2 gram of concentrated sulphuric acid. If frothing and a smell of burning sulphur be observed, an admixture of copaiba balsam is probable. (Confirm by tests 2 and 5.)

b. After the mixture has cooled wash it first with hot and then with cold water. The residue should be at first plastic and afterwards hard and brittle. A smeary character indicates an admixture with castor oil. (Confirm by test 2.)

c. Dry the washed resinous mass superficially with blotting paper, and dissolve it in several grams of ether. It should dissolve completely; if an insoluble residue be left it indicates an admixture of benzoin or storax. Treat this insoluble residue with strong alcohol, or preferably with acetone. If it dissolves completely, the adulterant is benzoin, in cases where carbon bisulphide leaves more than 16 per cent. of the balsam undissolved (test 3). If after treatment with alcohol (or acetone) there remains a white powder, easily soluble in chloroform, and separating in microscopic crystals upon evaporation of the solvent, storax is present. (Confirm by test 5.)

(5). Dissolve 1 gram of balsam in 3 grams of ammonia solution, specific gravity ·960. No gelatinization of the mixture should take place or appearance of gelatinous fragments swimming in the ethereal layer; otherwise storax is present. (Confirm by test 4.) The mixture should

separate readily into two layers, the lower of which when separated, supersaturated with acetic acid and heated to boiling, should only present a slight turbidity. The separation of solid resin shows copaiba balsam or colophony. The former gives the reaction mentioned under test 4; further, the extract obtained by evaporation of the petroleum spirit solution (test 2) has clearly the smell of oil of copaiba, whilst a colophony residue has no special odor.

Quantitative Estimation of Adulterants.

(1). *Estimation of Benzoin Admixture.—a.* An admixture of solution of benzoin increases the amount insoluble in carbon bisulphide, which in the case of genuine Peru balsam was never found by the author to exceed 16 per cent., to the extent of the whole of the benzoin resin, exclusive of the benzoic acid by which it is accompanied, and this may be used as the basis of one method of estimating the extent of adulteration with benzoin.

Example.—1 gram of a mixture of equal parts of Peru balsam and an alcoholic solution of benzoin containing 75 per cent. of resin, when treated with carbon bisulphide, left a residue which, dried at 100° C., weighed 0·38 gram. Of this 0·08 gram is reckoned as belonging to the half gram of Peru balsam, and the remaining 0·30 gram as the amount of resin in the half gram of benzoin solution.

b. A second method of estimating added benzoin is based upon the amount of residue insoluble in ether after the sample of balsam has been treated with sulphuric acid. The undissolved residue amounts to about half the benzoin resin or one-third of the benzoin solution.

Example.—1 gram of a Peru balsam containing 14 per cent. of benzoin solution, after treatment with sulphuric acid, left a residue of 0·05 gram insoluble in ether, which represented 10 per cent. of benzoin.

c. The direct estimation of the Peru balsam in a sample adulterated with benzoin may be effected by repeatedly shaking it with petroleum spirit, which dissolves out nearly half the Peru balsam as well as the benzoic acid of the benzoin. If 1 gram of the balsam be mixed with 0·30 gram of calcic hydrate, and allowed to stand an hour, the petroleum spirit then dissolves only 41 per cent. of the balsam of Peru present, so that the quantity of this may easily be calculated.

Example.—From a balsam mixed with 14 per cent. of benzoin solution, after maceration with calcic hydrate, petroleum spirit dis-

solved 35 per cent. (cinnamein), which, according to the proportion $41:100=35:x$, indicated 85 per cent. of Peru balsam.

(2). *Estimation of Admixture of Purified Storax.*—As purified storax consists, like Peru balsam, mainly of styracin, cinnamein and cinnamic acid, though with a greater preponderance of styracin, the estimation of added storax is difficult, and can only be effeted by preparation of the crystalline styrogenin as before described. The quantity of styrogenin left after evaporation of the chloroform amounts to about 7 per cent. of the storax present in the balsam.

Example.—1 gram of a mixture of equal parts of Peru balsam and purified storax yielded 0·03 gram of styrogenin.

(3). *Estimation of admixture of Colophony.*—*a.* The direct estimation of colophony is effected by shaking the ethereal solution of balsam with ammonia solution, sp. gr. ·960, as before described, and separating the resin taken up by supersaturating with an acid. The solid resin dried at 100°C. amounts to seven-eights of the colophony present.

Example.—1 gram of balsam mixed with 23 per cent. of a 60 per cent. solution of colophony yielded 0·115 gram of solid resin from the ammoniacal layer of liquid.

b. The direct estimation of the Peru balsam present may be made by macerating the sample with caustic lime and exhausting with petroleum, as in the estimation of benzoin.

Example.—1 gram of balsam containing 23 per cent. of solution of colophony, macerated with caustic lime, gave up to petroleum spirit 0·32 gram (cinnamein), corresponding, according to the proportion, 41:100, to 0·78 gram of Peru balsam.

(4). *Estimation of Admixture of Castor Oil.*—The author was unable to accomplish the direct estimation of the castor oil, being unable to separate it from the balsam by any suitable solvent; nor was he more successful in saponifying it with an alcoholic solution of an alkai. An attempt was also made to remove the oil from the resinous mass resulting from treatment with sulphuric acid, but it was found that the castor oil was so much decomposed by the strong acid as to be no longer soluble in petroleum spirit.

a. The amount of admixture may, however, be estimated by first ascertaining the amount of cinnamein and castor oil dissolved out by petroleum spirit, and then the amount of cinnamein alone. 1 gram of the mixture of balsam and castor oil is first macerated for an hour

with 0·30 gram of caustic lime, without the addition of water, and then exhausted with petroleum spirit, which dissolves the cinnamein (41 per cent.) of the balsam together with all the castor oil. A second quantity, with the addition of water, is macerated in a water bath for several hours, by which the saponification of the oil, but not of the balsam is induced. Petroleum spirit then dissolves only the cinnamein of the balsam. The difference in the two results gives the amount of castor oil, whilst the quantity of Peru balsam can be easily calculated from the cinnamein. Of course the exactitude of the result is dependent upon the complete saponification of the oil.

b. A more simple plan is to exhaust the sample by three or four shakings with petroleum spirit, and then to estimate the soluble constituents by evaporating the solution, and the insoluble by drying the residue. The former include nearly one-half of the Peru balsam, together with castor oil; the latter more than one-half of the Peru balsam present. By subtracting the amount undissolved from that dissolved, an approximation to the quantity of castor oil is obtained.

Example.—1 gram of balsam containing 23 per cent. of added castor oil, left after four shakings with petroleum spirit 0·40 gram undissolved, which indicated approximately 80 per cent. of Peru balsam. The petroleum spirit left upon evaporation 0·60 gram of oily residue, which quantity indicated somewhat more than 20 per cent. of castor oil (0·60—0·40=0·20).

(5). *Estimation of Admixture of Copaiba Balsam.—a.* The proportion of Peru balsam is estimated directly by digesting the sample for several hours with caustic lime and water, exhausting the mass completely with petroleum spirit and leaving the filtered liquid to evaporate. In this way there is at first obtained 41 per cent. of the Peru balsam, together with the essential oil of copaiba. To volatilize the latter the residue is heated in a water bath until it no longer perceptibly loses weight. What is now left represents 41 per cent. of Peru balsam, whilst the loss in weight gives the amount of essential oil of copaiba.

b. The amount of copaiba resin is found by means of the caustic ammonia test, as described for colophony. If to this be added the amount of essential oil as obtained in the preceding experiment, the total will represent the amount of copaiba balsam present.

Example.—1 gram of Peru balsam containing 30 per cent. of added copaiba balsam after being digested with lime and water gave up to

petroleum spirit 0·38 gram, which in the water bath decreased to 0·27 gram, representing 0·11 gram of essential oil. The 0·27 gram of residue indicated 66 per cent. of Peru balsam. (41:100.) 1 gram of the same sample gave when treated with ammonia solution 0·17 gram of solid resin, which added to the 0·11 gram of essential oil made a total of 0·28 gram, or 28 per cent. of copaiba balsam.

b. A more simple and sufficiently exact method is to shake the sample repeatedly with petroleum spirit, and to weigh the undissolved portion after drying at 100°C., and the dissolved portion after evaporation of the spirit at the ordinary temperature. The undissolved portion amounts to a good half of the Peru balsam, and by subtracting the amount from that of the evaporation residue, an approximation to the quantity of copaiba balsam is obtained.

Example.—1 gram of Peru balsam containing 30 per cent. of added copaiba balsam, left after shaking with petroleum spirit 0·35 gram undissolved, or equal to 70 per cent. of Peru balsam. The petroleum spirit left upon evaporation 0·65 gram. Consequently 0·65—0·35=0.30 gram (30 per cent.) of copaiba balsam.—*Phar. Jour. and Trans.*, Oct. 21, 1882, from *Archiv der Pharmacie.*

ACTION OF OZONE ON METALLIC SALTS AND OXIDES.

By Mailfert.

Mercurous Salts.—The *nitrate* is entirely decomposed by ozone, with formation of mercuric nitrate and a yellow precipitate of trimercuric nitrate. The *sulphate* behaves in a similar manner, mercuric sulphate and basic sulphate being formed. Mercurous *chloride* is acted on somewhat more slowly with formation of mercuric chloride, and a brick-red precipitate, apparently an oxychloride. The *bromide* is acted on in a similar manner. With the *iodide* the action is extremely slow, mere traces of red precipitate being produced even after the ozonized gas had been passed for 15 hours.

Silver Salts.—With the *nitrate*, a bluish-black flocculent precipitate of peroxide is produced, which, however, is decomposed and redissolved on agitating the solution. The *sulphate* likewise gives peroxide, but the *chloride* and *cyanide* are only very slowly acted on.

Palladium Salts.—The nitrate, chloride, and protoxide give the dioxide by the action of ozone. The protoxide, in presence of potassium hydroxide, gives potassium palladate.

Cobalt and Nickel Salts.—The sulphates, nitrates, and chlorides are but slowly attacked. The protoxides, on the other hand, are easily converted into peroxides.

Lead Salts.—All the basic salts give lead peroxide, as do many of the neutral salts; the chloride, nitrate, oxalate, and phosphate, however, are but very slowly acted on. Lead oxide is also changed into peroxide by ozone, in presence of potassium hydroxide, it gives potassium plumbate.

Manganese Salts.—All the manganese salts, in moderately concentrated solution, give a brown or black precipitate, consisting of the hydrated dioxide if the ozone is in excess, and of a lower oxide if it is not. In the former case a violet solution, containing permanganic acid is frequently produced. If excess of ozone acts on a very dilute solution of a manganous salt (in 30,000 to 60,000 of water), a brown dicroic solution is obtained, which slowly decomposes after a time, depositing a rusty brown precipitate, and leaving permanganic acid in solution.

Chromic Salts.—The sulphate, chloride, and oxide all yield chromic acid. If ether is present, perchromic acid is formed.

Bismuh oxide gives bismuthic acid, and in presence of potassium hydroxide potassium bimuthate.

Iron sesquinoxide is not acted on by ozone, but in presence of potassium hydroxide it yields potassium ferrate.—*Jour. Chem. Soc.*, Nov., 1882; from *Compt. Rend.*, 94, 850–863.

THE HISTORY OF CITRINE OINTMENT.

By R. A. Cripps.

Bell Scholar in the School of Pharmacy of the Pharmaceutical Society.

Paper read before the School of Pharmacy Students' Association, June 22, 1882.

A short time ago I was asked by Professor Attfield to reply to some queries which had been put to him by Mr. Adolph G. Vogeler, of Chicago, respecting citrine ointment. I gladly undertook the work, and the outcome is the present paper. Mr. Vogeler concurs in my wish to read it before this Association.

The preparation known as citrine ointment has from time to time been prepared from numerous and widely-differing formulæ.

The first notice of it is found in the London Pharmacopœia of 1650,

a most complicated formulæ being given to it; among the ingredients may be mentioned white coral, limpet shells, tragacanth, quartz, white marble and white lead, made upon a basis of hog's lard, suet and hen's grease. How such substances could be made into a presentable ointment is difficult to imagine when we remember how little apparatus was at the command of the pharmacists of that day. It is said to have been used in many skin diseases and for freckles.

In the London Pharmacopœia of 1668 the formula remains the same while in those of 1678 and 1682 several of the ingredients are omitted, sugar of lead replaces carbonate, and rosewater, frankincense, and citron bark are added. The Edinburgh Pharmacopœia of 1722 orders under the same name an ointment of an entirely different nature, the formula being:

℞ Hydrargyri, ... unciam unam.
Spiritus nitri, ... q.s.
Ut fiat solutionem, cui adde paulatim
Axungiæ porcinæ liquifactæ, libram unam.
Misce. Fiat unguentum.

It was not till long after this that a citrine ointment containing mercury was admitted to the London Pharmacopœia, perhaps from the fact that with a formula such as the above very varying results were naturally obtained; indeed, we find no mention whatever of it in the London Pharmacopœia of 1724, while in that of 1746 it is similar to resin ointment with the addition of 1 oz. of yellow wax to each 8 ozs.

Quincy, in the "London Dispensatory" of 1730, gives a similar formula, viz.:

Yellow resin, ...	½ lb.
Sheep's suet, ...	4 ozs.
Turpentine, ...	2 ozs.

To be melted together and strained. No doubt the pharmacist thought this a vast improvement on the former ointment so difficult to prepare; but he was not long to remain in this state of case as regards citrine ointment, for in the London Pharmacopœia of 1787 a new formula was given to it which bade fair to cause him more trouble than the last.

Some say it was introduced in imitation of the well-known "golden eye salve," but others state that it was of French origin, having been used in Paris for the cure of the itch. If the former were the case, it was not satisfactory, "golden eye salve" being an ointment of yellow oxide of mercury.

The formula was:

℞	Hydrargyri pur., ...	unciam unam.
	Acidi nitrosi, ...	uncias duas.
	Axungiæ præp., ...	libram unam.

Dissolve the mercury in the acid, and then mix the boiling liquid with the lard previously melted, remove from the dish and allow to cool. The same formula was used in the Edinburgh Pharmacopœia of 1792, but it was ordered to be stirred diligently during the cooling; a milder ointment was also official, containing half the quantity of lard. In 1803 the Edingurgh Pharmacopæia ordered 12 ozs. of lard instead of 16, the milder ointment containing three times that amount. Notwithstanding these continued alterations the ointment was still very unsatisfactory, it varied greatly with the temperature employed in preparing it, and after keeping usually became gray with greenish patches, and so hard that it could sometimes be powdered. This was stated to be due to the oxidation of the lard by the nitric acid, and many other substances were tried as a basis, among which the most important were butter, olive oil, and neat's foot oil. Accordingly we find in the Edinburgh Pharmacopœias of 1807, 1809, 1813 and 1817 a formula having as a basis 1 part lard to 3 parts of olive oil; in that of Dublin, 1807, 1 of lard to 4 of oil; and London, 1809, 2 parts oil to 3 of lard: still the results were quite insatisfactory, and many were the theories propounded to account for the changes to which it was liable, excess of nitric acid, deficiency of nitric acid, too high or too low a temperature, the presence of salt in the lard, impure mercury, and a fatty basis of unsuitable nature, all received their supporters. Acting upon the first of these theories the authorities of the London Pharmacopœias of 1817, 1824, 1836, and 1851 ordered 11 drachms of acid in place of 2 ounces, the formula of the last being:

℞	Hydrarg. pur., ...	℥i,
	Acid. nitric, ...	ʒxi,
	Ol. olivæ, ...	℥iv,
	Adipis præp., ...	℥viii.

Ft. unguent.

They also ordered a milder ointment, containing one part of strong ointment to 7 of lard. The Dublin Pharmacopœia of 1850 also orders less acid, while those of Edinburgh, 1839 and 1841, direct a larger quantity.

The British Pharmacopœia of 1864 gives the following formula:
Take of

Mercury,	4 ounces.
Nitric acid, sp. gr. 1·5,	8 "
Lard,	15 "
Olive oil,	32 "

Dissolve the mercury in the acid with the aid of a gentle heat, melt the lard in the oil, by a steam or water-bath in a porcelain vessel capable of holding six times the quantity, and while the mixture is hot add the solution of mercury, also hot, mixing them thoroughly; if the mixture does not froth up heat till this occurs.

The B. P. of 1867 orders 12 ounces of nitric acid, sp. gr. 1·42.

This formula will give an excellent ointment, and when complaints are made of the result will be found that the fault is in the operator, not in the formula. The instructions must be strictly adhered to, or a failure will probably result, and especial regard must be paid to the temperature af which the mixture is made, which should range from 180° to 200°F., and should not be too long continued, but only until the ointment froths up well; if large quantities be made the temperature may be a little lower. As thus prepared it is of a fine lemon-yellow color, and keeps for a fair length of time, perfectly good.

Such are the varied formulæ which have from time to time been given to this interesting ointment; but before leaving the subject I should like to devote a short notice to the chemistry of the preparation.

The views of chemists regarding the chemical composition of the ointment vary considerably. Evidently the original idea was to obtain an ointment of mercuric nitrate; hence the name given to it in the Pharmacopœias. But this was entirely a failure, for on adding the acid solution of nitrate to the melted lard chemical decomposition occurs, as indicated by the frothing. Still, this was considered as simply the result of the oxidation of the fat by the excess of acid; but Mr. Schacht, who made a number of experiments in the laboratories of the School of Pharmacy, showed that the ointment, when carefully prepared, is soluble in ether, thus indicating that the mercury exists as some compound with a fatty acid, the nitric acid in combination with the mercury being in some way retained while the excess is evolved during effervescence. In M. Schacht's valuable paper (which will be found in the "Pharmaceutical Journal" [1], vol. iv, p. 450, he also

states that the failure in obtaining a good ointment is not due to the presence of salt in the lard, or of lead in the mercury, and that ointment spoiled by keeping may be restored by warming with nitric acid, thus indicating that nitric acid is essential to its preservation, and that by keeping some of the acid is lost.

But in the "Pharmaceutical Journal" [3], vol. vi, p. 708, in a paper by Mr. Fredigke, of Chicago, it is stated that a superior ointment both in appearance and in durability may be prepared by oxidizing the fat by nitric acid, previous to adding the mercurial solution. This would seem to show that the oxidized fat forms a compound with the mercuric nitrate, the color being due to the elaidin formed by reaction of fat and acid.

Such, then, are the results of their experiments; but as they are to a great extent conflicting, it is impossible to arrive at any definite conclusions without experimental research, and pressure of time debarred me from such a course, so that I have been obliged to leave the subject with this historical sketch.—*Phar. Jour. and Trans.*, Nov. 4, 1882.

NITRATION OF CELLULOSE.

By Vieille.

The cellulose used was in the form of cotton-wool. The lowest nitration product, mononitro-cellulose, is obtained by the action of nitric acid of sp. gr. 1·450. It is insoluble in ethyl acetate and in a mixture of alcohol and ether: analyzed by Schloesing's method, 1 gram yields 108·9 cc. of nitric oxide. A nitration product, soluble in a mixture of alcohol and ether, and therefore suitable for making collodion, is given only by acid of sp. gr. between 1·490 and 1·496. It retains the structure of the original cotton, and is entirely soluble in ethyl acetate; 1 gram yields 183 to 194·4 cc. of nitric oxide. The time required to produce the maximum nitration with acid of a particular strength is longer the weaker the acid, 2 to 3 hours sufficing with acid of sp. gr. 1·50, whilst acid of 1·483 requires 120 hours. With acid of sp. gr. 1·470, however, the cotton swells up and dissolves immediately, and under these conditions nitration is rapid; when the syrupy solution is poured into water, a white precipitate, which has none of the structure of the original cotton, is thrown down. Acid of sp. gr. 1·460 acts only slowly on cotton, but the fibres become very brittle, and the

product is collected in the form of a pulp. Weaker acid has little or no action on cotton. The maximum nitration is obtained with a mixture of nitric and sulphuric acids. The result is not sensibly affected by the relative proportions of the two acids, even if Nordhausen sulphuric acid is used, but a large excess of sulphuric acid considerably diminishes the rapidity of the reaction. The product has the composition $C_{24}H_{29}(NO_2)_{11}O_{20}$, retains the appearance of the original cotton, is completely soluble in ethyl acetate, but only very slightly soluble in a mixture of alcohol and ether. I gram yields 214 cc. of nitric oxide.—*Jour. Chem. Soc.*, Nov., 1882; from *Compt. Rend.*, 95, 132–135.

PREPARATION OF PRESSED YEAST.

Hayduck has investigated the utilization of the nitrogenous constituents in the manufacture of pressed yeast. To determine the quantity of nitrogen contained in the raw materials, which can be assimilated by the yeast, the finely bruised substances were extracted with distilled water at 50°, or with dilute sulphuric acid at the same temperature. The total quantity of soluble proteïds was determined in the filtrate, after which the solution was treated with a sufficient quantity of sugar. Seed-yeast was then added, and the nitrogen was again determined after the end of the development. The difference between the nitrogen obtained and the total quantity originally found in the solution gives the nitrogen assimilated by the yeast. From oats, about 38 per cent. proteïds could be extracted with water at 50°; the quantity of assimilable proteïds, however, was only about 16 per cent., so that it was impossible to draw any conclusions from these data as to the utility of the solution in the nutrition of yeast. Maize lost about 12 per cent. of soluble proteïds, of which 7 per cent. was assimilable. Hence, maize proteïn is less soluble in water than the proteïds of oats, but a larger proportion of the former is utilized in the nutrition of yeast. From oats treated with water and lactic acid (0·5 per cent. solution), 60 per cent. of proteïds was dissolved, 31 per cent. being assimilable. Lactic acid has a powerful peptonizing action on oat proteïn, but with maize it seems to be without action. In the case of barley-malt, large quantities of proteïds were dissolved by the treatment with water and ½ per cent. lactic acid. In another experiment, malt and potatoes were mashed together in the proportion of 1 : 24, and the mixture diluted to

12° saccharometer. On analysis, the potato-mash gave 0·1 per cent. dissolved nitrogen, 60 per cent. being assimilable. It is shown that, contrary to the opinion usually held, this solution is well adapted to the growth of yeast.

Delbrück describes the employment of potatoes in the cultivation of pressed yeast. According to the process of Schuster and Burow, the potatoes are steamed, water being previously added. Schuster further uses a small quantity of sulphuric acid. The pressure is maintained at a moderate degree. Burow recommends to introduce into the steamers first the potatoes, then the necessary quantity of water, and finally the requisite quantity of bruised maize. The effect of the addition of a small amount of sulphuric acid is not only to improve the color, but to prevent the formation of bacteria.

Birner recommends the use of asparagin as nutriment for the yeast cell; for this purpose leguminous seeds are steamed and added to the mash.

Schuster proposes to prepare pressed yeast and spirit from unbruised corn without the application of steam pressure. The corn is digested with sulphuric acid at 40° (100 kilos. corn, 660 cc. pure sulphuric acid, and 200 liters water). After the expiration of 48 to 60 hours the material is brought into a mashing vat and ground to a fine powder, which is effected with great ease. The saccharification is more rapid and complete.

Hayduck has studied the influence of alcohol on the development of yeast. Fusel oil was found to retard considerably the progress of the fermentation of yeast. 0·5 per cent. amyl alcohol in a 10 per cent. solution of sugar impeded its progress, while 2 per cent. completely prevented the fermentation. Alcohol arrests the fermentation if present to the extent of 15 per cent. by volume, and smaller quantities retard the action. The fact that the formation of yeast is usually completed after the expiration of about 30 hours is explained either by the consumption of an ingredient in the mash indispensable to the development of yeast, or by the formation of a fermentation product which prevents the further progress of the yeast. It was also found that a solution of potato-mash containing 9·25 per cent. (by volume) of alcohol showed signs of fermentation after filtration and addition of yeast, but did not develop yeast. After the removal of alcohol from another portion of the filtrate by distillation, adding water to make up the solution to the original volume, and treatment with yeast, a further

growth occurred with consnmption of nitrogenous constituents. In conclusion, it is mentioned that the assumption that potato-mash is deficient in nitrogenous nutrients is disproved by these experiments.—*Jour. Chem. Soc.*; from *Dingl. Polyt. J.*, 244, 448–456.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

The leaves of Globularia Alypum contain, according to E. Heckel, fat, wax, tannin, globularin, cinnamic acid, mannit, glucose, resins, gummy and coloring matters, 2·1 per cent. of ash, 26·2 water and 13·1 cellulose. The globularitannic acid of Walz was a mixture of tannin and coloring matter. Globularin is a glucoside, but does not yield paraglobularetin; globularetin is at first oily or resinous, gradually becomes transparent and amorphous, and when dissolved in hot alkaline solutions combines with the elements of water, forming cinnamic acid. A small quantity of a volatile aromatic compound, probably benzyl cinnamate, was likewise found in the leaves.—*Comp. Rend.*, cv, p. 90–93.

The leaves of Tarchonanthus camphoratus, nat. ord. Compositæ, yield to hot alcohol a crystalline substance which, after washing with cold alcohol and recrystallizing, was found by F. Canzoneri and G. Spica to have a silvery lustre, to melt at 82°, solidify at a slightly lower temperature, and afterwards melt at 72°C. It is tasteless, insoluble in water, freely soluble in hot but sparingly soluble in cold alcohol, resists the action of acids and alkalies, and burns, giving off the odor of wax. It is probably a homologue of myricyl alcohol, and contains 50 or more atoms of carbon. The authors call it *tarconyl alcohol.* Alcohol takes also up a heavy dark-colored oil, having a pungent taste, and consisting mostly of an ether of an aromatic acid. The plant is indigenous to Southern Africa.—*Gazzetta*, 1882, p. 227.

Fat of the California Laurel, Umbellularia (Oreodaphne, *Nees;* Tetranthera *Hook. et Arn.*) californica, *Nuttall.*—The volatile oil obtained from the leaves was examined by J. P. Heamy ("Am. Jour. Phar.," 1875, p. 105). J. M. Stillman and E. C. O'Neill have extracted from the seed, by means of ether, a tallow-like fat, melting at 31° to 32°C., having in the melted state the specific gravity 0·925, and possessing a disagreeable irritating taste, which is probably due to a little

free acid. The fat is sparingly soluble in alcohol, but dissolves freely in ether and benzol. It contains a new fatty acid, *umbellulic acid*, of the formula $C_{11}H_{22}O_2$, melting between 31° and 34°, and when heated emitting a disagreeable irritating odor. The pure acid is white crystalline, irritating to the mucous membranes of the throat, boils under ordinary pressure between 270° and 275°C., and distils without decomposition.—*Amer. Chem. Jour.*, iv, 206–211.

The presence of asparagin in leaf buds was announced by J. Borodin ("Bot. Zeitung," 1878, p. 802), and has been verified by E. Schulze and J. Barbieri, who found it in the extracts obtained from the young leaves of birch, horse chestnut and plane trees; the latter yielded also ·5 to 1 per cent. of *allantoin*, calculated for the dry leaves; but urea could not be detected. The horse chestnut leaves contained, besides a small quantity of asparagin, also *leucine*.—*Jour. Prakt. Chem.*, xxv, 145–158.

Cholesterin in plants was first discovered by Beneke in 1862, and his observation was confirmed by Hoppe-Seyler, Hesse and others. E. Schulze and J. Barbieri have isolated from Lupinus luteus, *Lin.*, two modifications of cholesterin, one from the cotyledons, the other from the shoots, which they propose to call *caulosterin*. The following varieties of cholesterin have thus far been described: 1, ordinary cholesterin, melting point 145° to 146°C.; 2, phytosterin (O. Hesse), m. p. 132° to 133; 3, paracholesterin (Reinke and Rodewald), m. p. 134° to 134·5°; 4, caulosterin, m. p. 158° to 159°C., and 5, isocholesterin, m. p. 138° to 138·5°. All except the latter are lævorotatory, and give the characteristic color reaction with chloroform and sulphuric acid.—*Ibid.*, 159–180.

Bulgarian Opium.—The cultivation of the opium poppy in Bulgaria has been introduced under the auspices of the medical council and of the Secretary of the Treasury, the latter having distributed seeds as late as 1879. A. Teegarten reported in 1881 (see "Am. Jour. Phar.," 1881, p. 307) on the opium obtained in the Lowtscha district in 1880. Since that time several Macedonians who were practically acquainted with the preparation of opium were engaged, and the author now describes the following samples thus obtained.

Opium from Kuestendil is in hemispherical cakes, weighing from 120 to 300 gm. While still soft the opium is formed into balls, which are laid upon grapevine leaves and covered with the same leaves so as to

leave the sides free. The cakes have an exceptionally strong narcotic opium odor, are externally brown, internally lighter, very dry (moisture 7·63 per cent.), and show upon the fractured surface a large number of small tears of the size of a millet grain to that of a lentil. The taste is very bitter; water takes up nearly two-thirds of the weight of the opium, yielding a clear brown solution of an acid reaction and acquiring a dark red color with ferric chloride. The ash amounts to 2·69 per cent.

Opium from Lowtscha is in irregular oblong or quadrangular cakes, weighing 100 to 200 gm., and covered with green leaves; the tears upon the fracture are less distinct, and the powder is of a lighter color than the preceding. Moisture 10·39, ash 2·36 per cent.

Opium from Hatitz is in round, somewhat convex cakes, about 13 centimeters in diameter, and 2 centimeters thick near the centre. The cakes are covered with small leaves and are of a rather light brown color; the aqueous solution is of a lighter color, has a less distinct acid reaction, and filters less readily than the two preceding samples. Moisture 10·86, ash 2·85 per cent.

Calculated for dry opium, the different varieties yield for 100 parts:

	Kuestendil.	Lowtscha.	Hatitz.
Ash,	2·63	2·63	3·2
Morphine,	20·73	13·28	8·13
Other principles soluble in water,	47·54	50·58	40·85
Insoluble in water,	31·73	36·14	51.02

—*Phar. Zeits. Russl.*, 1882, Oct. 3, 747–752.

Macleya cordata, a papaveraceous plant of Japan, contains, according to Eykman, two alkaloids, of which one is identical with sanguinarine, the other apparently with protopine.—*Ibid.*, p. 757, *Arch. d. Phar.*

Wine made from Unripe Grapes was found by F. Musculus and C. Amthor to contain abnormally large proportions of extractive matter, acids, ash, and phosphoric acid and a small amount of alcohol. The extractive is gelatinous and probably contains pectin compounds. The authors conclude that during the ripening of the fruit the greater portion of the mineral constituents pass into the stem.—*Zeitschr. Anal. Chem.*, xxi, 192.

Pistacia Resin, which has recently appeared in commerce, is obtained from Pistacia terebinthus and, according to Christy, is well adapted for varnishes. It is light-yellow, soluble in fixed oils, oil of turpentine and alcohol, has a mastich-like odor and, mixed with common

resin, is not affected by a 25 per cent. solution of soda. The varnish dries rapidly in the air and is well adapted for painting upon glass and porcelain.—*Phar. Zeits. Russl.*, Oct. 3, 1882, p. 75. from *Jour. Phar. Chem.*

The Poisonous Constituents of Tobacco Smoke (see also this volume p. 492), according to R. Kissling, are carbonic oxide, sulphuretted hydrogen, hydrocyanic acid, picoline bases and nicotine, the first three being present in too small a proportion, and their volatility being too great for exerting any important influence. The picolines are likewise present in relatively small quantities and the toxic action of tobacco smoke is mainly due to nicotine, of which but little is destroyed in smoking cigars.—*Dingl. Polyt. Jour.*, vol. 244, p. 234–246.

Effect of Potassa upon Strychnine.—H. Goldschmidt observed that on melting 1 part of strychnine with 10 parts of potassa and a little water a milky liquid having a chinoline-like odor distils first, afterwards heavy yellow drops, which partly congeal in the condenser. This substance is decomposed by dilute acids yielding a compound agreeing in its reactions with *indol.*—*Chem. Ztg.*, 1882, No. 61, from *Berichte*, xv, 1977.

Stains of Cinchonic Red.—

To the Editor of the American Journal of Pharmacy:

Having found the red stain produced by tincture cinchona comp. upon bottles in which it is kept very difficult to remove, I have experimented with several solvents, and, taking advantage of the well-known solubility of cinchonic red in alkalies, have found that the ordinary strength aqua ammoniæ dissolves it at once and completely, no matter how old or dry it may be.

Yours, etc.,

HENRY H. WETHERILL, M.D., PH.G.

Pennsylvania Hospital for Insane, 50th and Haverford road,
November 14, 1882.

VARIETIES.

UNGUENTUM NAPHTHOLI.—Prof. Kaposi uses in skin diseases an ointment composed of naphthol 15, prepared chalk 10, soft soap 50, and lard 100 grams.

LINIMENTUM NAPHTAOLI, used in eczema crustosum of the scalp is made by mixing one part of naphthol with 100 parts of a fat oil like almond, olive, or cod liver oil.— *Wien. Med. Wochenschr.*

BURNT ALUM IN AGUE.—Bamboo Brojendra Nath Banerjee states that this is a very cheap, easily procurable, and efficient antiperiodic medicine. The value of alum is chiefly marked in cases of fever in which the attacks come on with clock-work regularity. It generally fails in irregular types of intermittent fever. Two doses are generally sufficient to complete the cure. Eight grains of burnt alum are to be given in each dose. The first dose is to be given three hours and the next an hour before the expected attack of fever.—*Indian Med. Gazette; Louisville Med. News*, Sept. 30.

SULPHURETTED HYDROGEN IN TUBERCULOSIS.—Prof. Arnoldo Cantani has been experimenting with sulphuretted hydrogen in the treatment of tuberculosis. The reputation of certain sulphur springs, as well as the known properties of the antiseptic, led him to regard the treatment as hopeful. He administers the gas partly in solution and partly by inhalation in a special chamber. He finds so far, that (1) the inhalation of an atmosphere strongly impregnated with sulphuretted hydrogen can be well borne for a considerable time by most patients, and those who find it irksome at first soon get accustomed to it; (2) the patients usually become free of fever in a day or two; (3) the local changes appear not to increase, and the cough becomes less.—*Centralb. f. Med. Wissensch.; Louisv. Med. News*, Sept. 30.

POMADE FOR COMEDONES.—The St. Louis "Medical Journal" says that Una, in "Virchow's Archives," recommended the following for comedones: Kaolin, four parts; glycerin, three parts; acetic acid, two parts, with or without the addition of a small quantity of some etherial oil. With this pomade he covers the parts affected in the evening, and if need be during the day. The comedones can be easily expressed after several days, most of them coming out by washing the parts with pumice-stone soap.—*Chic. Med. Review*, Oct 15.

GLACIALIN.—According to Dr. Besana, this substance, which has met with so much favor in England and elsewhere as an antiseptic, especially for the preservation of milk, meat and other articles of food, has the following composition: Boracic acid, 18 parts; borax, 9 parts; sugar, 9 parts; glycerin, 6 parts. A Roman composition of a similar kind was found to be nothing but pure boracic acid. It is called salt of glacialin, and sells at five francs per kilogram (about forty-five cents a pound), the market price of boracic acid being exactly half that rate.—*Boston Journal of Chemistry.*

SALICYLATE OF SODIUM FOR SORE THROAT.—After a large number of observations Dr. Robt. N. Hormazdji, of Cheltenham, has come to the conclusion that in all acute cases of *tonsillitis* salicylate of sodium is a specific, while in chronic cases it seems to possess no effect whatever. He recommends about 15 grains of the remedy every hour, till the most urgent symptoms are relieved, when only half the dose is administered. At the same time he employs a gargle, consisting of about 10 grains of the salicylate of sodium, 1 ounce of glycerin and 3 ounces of water. He found the remedy especially specific in its effect in very acute and severe cases, as also in the angina of scarlatina, and of erysipelas.—*Med. and Surg. Rep.*, Oct. 28.

RESORCIN IN CHOLERA INFANTUM.—Dr. M. Cohn, in his inaugural thesis at Stuttgart ("Centralbl. f. d. Med. Wissen.," 1882, p. 512) speaks of the effect of resorcin in cases of cholera infantum. He made use of a solution of 0·3 (5 grains) resorcin, 6 drachms of water and about two drachms of simple syrup. He observed no disagreeable side effects, and of 35 children who had suffered from summer complaint 30 rapidly regained their health. These observations were made at the University clinic for diseases of children, in Stuttgart. In no case was noted any bad results, and Cohn considers this remedy almost a specific in catarrhal inflammatory conditions of the alimentary canal in children. He found it also uniformly successful in all cases of stomatitis, aphthæ, etc.—*Med. and Surg. Rep.*, Oct. 28.

ASTRAGALUS MOLLISSIMUS.—Among the plants destructive to cattle in the West ("Weis Remedies," 1882) is the Astragalus Mollissimus, whose physiological action has been recently studied by Dr. Isaac Ott, of Easton, Pa. He summarizes it as follows: It decreases the irritability of the motor nerve, greatly affects the sensory ganglia of the central nervous system, preventing them from readily receiving impressions. Has a spinal tetanic action. It kills mainly by arrest of the heart. Increases the calloary secretion. Has a stupefying action on the brain. Reduces the cardiac force and frequency. Temporarily increases arterial tension, but finally decreases it. Greatly dilates the pupil.—*Chic. Med. Review*, Oct. 15.

HYOSCINE, prepared by Ladenburg, and crystallizable by hydriodic acid, has proved to possess, if dropped into the eye, a remarkably rapid mydriatic effect, and surpasses in this respect atropia in a high degree. But the solution should be only a half per cent. one, as stronger solutions (one and a half per cent.) cause already general symptoms, as unconsciousness, disturbances of articulation, vertigo, and dryness of the throat. It may be mentioned that this preparation seems to be well tolerated by the conjunctiva, even if kept a long time in contact with it.—*Medical Press; Louisv. Med. News*, Nov. 4.

STRYCHNINE IN ALCOHOLISM.—According to M. Luton, of Rheims, ("Bulletin de Therapeutique"),says the "Medical Record": One may observe in alcoholics a veritable excito-motor inertia of the spinal cord, capable of lessening the generally so marked effects of strychnine. Thus in individu-

als suffering from acute alcoholism this drug may and must be given in large doses to insure success. While in some cases three centigrams of sulphate of strychnia injected by demi-centigrams in the course of a day, suffice to relieve an attack of delirium tremens, in other instances more will be required. To an individual affected with delirium tremens, symptomatic of a varioloid, M. Luton has given hypodermically in fifteen hours, seven centigrams of strychnia sulphate, with real benefit and without accidents of strychnism. M. Luton is of the opinion that in the alcoholic, because of an acquired tolerance, there is no absolute limit to the employment of strychnine. The principal point is to divide the dose so as not to inject more than a centigram at a time. An interval of two hours suffices to exhaust the primitive or dangerous effects of the poison. It is necessary also to watch the patient closely, and to stop the remedy as soon as the delirium has ceased, and sleep has appeared, for from this time on inertia of the cord no longer exists, and the cumulative effects of the drug might otherwise suddenly manifest themselves.—*Chic. Med. Rev.*, Nov. 1.

PELLETIERINE TANNATE.—Dr. Berenger-Feraud ("Bulletin Générale de Therapeutique," translated in the "Medical Times") communicates the results of the various kinds of treatment for the removal of the tapeworm: Oil of turpentine, male fern, pumpkin seed, kooso, pomegranate root bark and pelletierine tannate. This last he considers the most powerful of all agents, as complete success was obtained in forty-six per cent. of the cases. As soon as proof of the presence of the intruder is obtained the patient is put upon milk and bread for the next two meals. On the next morning before rising an infusion of ten grams of senna leaves in one hundred grams of water sweetened with thirty grams of syrup of orange peel is administered. An hour later the patient takes half the dose of pelletierine diffused in twice its weight of water. The patient should lie still with closed eyes to prevent nausea and vomiting. Half an hour later the rest of the drug is given. After another half hour thirty or forty grams of castor oil are given. Should there be no stool an hour afterward purgative enemata are given. Success in this treatment appears to lie in the rapidity of the purgation.—*Chic. Med. Rev.*, Oct. 15.

THE POISON OF MUSHROOMS.—Prof. Roufick, of Breslau, has lately made experiments on the common mushroom, of which the following, published in the "British Medical Journal," are the results: All common mushrooms are poisonous, but cooking deprives them, more or less, of their poisonous qualities. The repeated washing with cold water which they usually undergo to clean them takes away a portion of the poison, and boiling does the rest; but the water in which they have been boiled is highly poisonous, and should be carefully gotten rid of. Experiments made on dogs showed that if a dog ate one per cent. of its own weight of raw mushrooms it fell sick, but recovered; if it ate one and a half per cent. the poison has a more violent but not fatal effect, and if it ate two per cent. it was inevitably fatal. The water in which mushrooms had been boiled was far more poisonous than even the raw mushrooms, while the mushrooms thus boiled could be taken without hurt to the amount of ten per

cent. of the weight of the dog's body. Washing with cold water does not remove all the poison, so that mushrooms thus prepared are poisonous when taken in larger quantities. Dried mushrooms are still dangerous for from twelve to twenty days, and also the water in which they have been boiled. They require to be dried for at least a whole month, and are only really safe after four months' drying.—*Chic. Med. Review*, Oct. 1.

NUTRITIVE VALUE OF SOUPS AND BROTHS.—The distinguished German Professor Virchow has been accused of being the chief opponent of soup. He says ("Scientific American") that this is not true, for he had merely said that meat broths are neither nutritious nor "substantial." That if all the meat which one uses should be boiled and soup made of it, the meat would become for the greater part indigestible, and the soup would not be a substitute for it. Ordinary meat broth or bouillon in its pure form can only be recognized as a condiment. By the addition of eggs, flour, fat and other things it may acquire a certain nourishing and heating value. It is, primarily, only a very dilute aqueous solution of substances that are in part of low value as heat producers, such as gelatin, and in part of the stimulating aromatic parts of the meat. Taken warm, it is of nearly the same value as coffee or tea, but is inferior to wine, schnapps or beer; it only stimulates the nerves. It has one advantage over every other condiment, namely, it contains no poisonous substance, it is incomparably milder, hence much better adapted to feeble persons; and finally, it can be very conveniently combined with substances that are actually nutritious, and imparts to them an agreeable and substantial taste.—*Chic. Med. Review*, Oct. 1.

MILK POWDER IN GASTRIC AFFECTIONS.—The "Medical Times and Gazette" says that Dr. Debove, in a communication to the Paris Hospital Medical Society, "Gaz. Hebdomadaire," August 25th, observes that the milk regimen, which is so indispensable in affections of the stomach, and especially simple ulcer, speedily becomes so disgusting to these patients that it has to be left off. This serious inconvenience, however, may be remedied by the employment of the œsophageal tube now used for feeding phthisical patients. But by this only a liter of milk can be introduced at a time, so that it would require to be employed six times in order to introduce the six liters, which is the mean quantity required for the subjects of *ulcus rotundum*. To avoid this frequent introduction of the tube Dr Debove has had skimmed milk evaporated (cream being but slightly digestible), and the residue reduced to a fine powder. If this be dissolved in warm hot water, two or three liters of milk may be injected in the same volume as a single liter. It is possible that this milk-powder, which furnishes excellent results in gastric affections, may also prove very useful in Bright's disease, cardiac affections, and all cases in which a milk regimen is employed. About a liter of pure milk is represented by 4 ounces of the powder. Dr. Dujardin-Beaumetz observed that in feeding the subjects of phthisis with the tube he has obtained excellent results from a mixture of powder of meat, powder of blood, and powder of milk. As powder of blood is not very digestible, he only adds a small proportion of that as a ferruginous principle.—*Med. and Surg. Reporter*, Nov. 4.

MINUTES OF THE PHARMACEUTICAL MEETING.

In the absence of the President the meeting was organized by calling Mr. A. P. Brown to the chair; the reading of the minutes of the last Pharmaceutical Meeting was proceeded with, and there being no objection, they were, on motion, approved.

A copy of the proceedings of the New Jersey Pharmaceutical Association was presented to the College by the chairman.

Dr. Miller introduced Dr. Formad, of the University of Pennsylvania, who proceeded to address the meeting upon the subject of "Bacteria," describing the four principal forms, explaining the nature of bacteria as fungi, and showing that they played an important part in the decomposition of organic matter.

The lecturer, who illustrated his subject by diagrams and sketches, and by a number of microscopical preparations, was listened to very attentively and was requested to furnish an abstract of the discourse for publication.

At its conclusion Mr. Boring moved, and it was unanimously adopted, that a vote of thanks be tendered Dr. Formad for his kindness in giving the instruction upon so interesting a topic. Prof. Maisch expressed his obligatien to Dr. Formad for the clear manner in which the subject had been laid before the meeting, and which had removed various hitherto doubtful points, so that he believed he could continue this intricate study with greater facility.

Mr. Heinitsh asked the meeting what was the general opinion of the members about the new Pharmacopœia, and in response several objections were raised; one member stated that he formerly trusted a clerk to prepare an article by the directions of the Pharmacopœia, while now he felt obliged to supervise every step of the process and see that all the calculations were correct before he permitted him to proceed with any of the work. Another thought that the work was fitted more for an adept than a learner, that the minutia and exactness of formulæ would tend to throw the work of preparations into the hands of manufacturing pharmacists and thus degrade our business.

There being no further business, on motion, the meeting adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

THE ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY held the second social meeting Tuesday, November 14th, Dr. A. W. Miller in the chair. Dr. Miller exhibited a cabinet of materia medica specimens for the use of students; it is conveniently arranged and provided with labels the blanks of which are designed to be filled while the specimens are examined for study.

Dr. Lautenbach delivered a lecture upon the various theories advanced in explanation of *the cause of disease*, and more particularly upon the influence of germs of various kinds upon vegetable and animal life.

After recitations by Mrs. L. Pearce, teacher of elocution, and Mr. Fink, a number of pharmaceutical specimens were examined and the meeting then adjourned.

THE CALIFORNIA COLLEGE OF PHARMACY held its commencement exercises at the Metropolitan Temple, San Francisco, on the evening of November 1st. After addresses by Mr. John Calvert, President of the Board of Trustees, and by Gen. W. H. Barnes, the President of the University of California, Professor W. T. Reid conferred the degree of Graduate in Pharmacy upon the following candidates: Robert L. Ball, Chas. L. Barrington, Joseph Calegaris, Eugene D'Artenay, Franklin T. Green, Emile Happersberger, Russel H. Judson, Jas. W. Tryon, David Wight, Wilfred M. Young. The first prize, a gold medal, was awarded to E. Happersberger, and the second prize, books of the value of $20, to R. L. Ball; H. Korper, a junior student, received the junior prize, consisting of a ticket for the second course, $50 in value; valedictory addresses were delivered by Professor Searby and by R. L. Ball, Ph.G.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN. At the Pharmaceutical meeting held November 1st the President, Mr. Michael Carteighe, in the chair, a paper by Dr. Thresh on the *Orchard Alum Spring* was read. The spring originates in a disused coal mine near the summit of Axe Edge, the highest point in the Peak country, and derives its name from the strongly astringent taste of the water, and from the farm on the hillside, a bleak and desolate spot known as the orchard. The country people use the water as a vermifuge, and externally for the cure of ring-worm. Dr. Thresh found its specific gravity to be 1·00351 and a gallon of it to contain 298·809 grains of solid constituents, namely: $Fe_2 3SO_4$ 174·426 gr., Fe_2O_3 6·275 gr., $Al_2 3SO_4$ 72·908 gr., $MgSO_4$ 21·055 gr., $CaSO_4$ 14·381 gr., $FeSO_4$ 1·596 gr., SiO_2 5·776 gr., and minute quantities of aluminium phosphate, sodium and potassium sulphates, potassium nitrate and chlorides of potassium and ammonium.

Mr. C. Patrouillard had sent a paper on the reducing *action of oxalic acid upon alkaline arseniates*, in which he acknowledged the correctness of Naylor and Braithwaite's observation (see "Am. Jour. Phar.", 1882, p. 533) that free arsenic acid is not affected, but maintained that arseniates boiled with oxalic acid or ammonium oxalate were thus reduced. Mr. Naylor referred to the effect produced by sulphuretted hydrogen and sulphydrate of ammonia upon arsenic acid at different temperatures, and promised further investigations into the conditions pointed out by Mr. Patrouillard.

Mr. J. Bland read a paper on *Tinctura Camphoræ Composita* (Tinct. Opi camph.), directing attention to the greater solubility in proof spirit of the oil of Pimpinella Anisum than of the oil of staranise. In the discussion the varying congealing points of the two oils were alluded to, and, by Mr. Allen, the effect of decreased temperature, which caused the separation of the iridescent scales.

EDITORIAL DEPARTMENT.

THE PURITY OF POWDERED DRUGS.—On pages 527 and 528 of our October number we have briefly reported on a paper read by Mr. Allaire, and on the remarks made on this subject at the meeting of the American Pharmaceutical Association. A valued correspondent, whose position and experience entitle his views to careful consideration, has sent us a lengthy communication, which we are obliged to condense, so as to give to our readers at least the outlines of the different points:

"Mr. Allaire's paper is valuable, because it calls attention to a very great abuse, and because it originated in a portion of the country where some remedy is most required. The distributing trade in drugs near the seaboard tends constantly to fewer hands, and is becoming more and more confined to the supply of the apothecary, whose pursuit from the standpoint of remuneration is followed more as a profession than as an ordinary business. In the interior the business is largely combined with other mercantile branches. Within a year past an eminent chemist analyzed the powdered opium from all the distributing trade in New York city, and with two or three trifling exceptions found all to be above the pharmacopœial standard. At least seven-eighths of all the powdered drugs distributed to the retail trade near the seaboard are strictly faithful (see also editorial remarks on page 588 of November number), and they are obtained from houses whose standing is well known. In various localities drug mills have been established, whose products cannot be sold at home, but are used for supplying the interior trade; these mills probably powder more goods than the regular distributors, and they find a market for sophisticated powders.

"What shall be the remedy? No doubt, the most important consists in the diffusion of correct information; hence, the value of such an organization as the American Pharmaceutical Association. Powdered drugs are pharmaceutical preparations, and all these should never be distributed to the apothecary under an assumed name. Chemicals can be readily tested by the standard of the pharmacopœia, and hence may be fairly put upon the market under the name or guarantee of the distributor; but no pharmaceutical preparation should be. Interior jobbers often purchase powders at less than or near the cost of crude drugs, and then distribute these to the apothecary trade under their own name on the dealer's general reputation as a merchant, for the reason that such goods pay better profits than goods of character, and that they give satisfaction, because accurate investigation is hardly possible. This can only be remedied by the demand that all powders shall bear the label of the manufacturer. Analytical research should be encouraged; but in so difficult a field as that of vegetable substances great care is necessary. As a rule, the most ready analysts are the least reliable, their positiveness being often the result of a want of experience or knowledge of the difficulty of accurate determination."

THE PUBLICATION OF THE PHARMACOPŒIA.—We have thus far refrained from alluding to the awarding of the contract for the publication of the new Pharmacopœia in the hope that something might turn up which would convince us of the incorrectness of our views in relation to the award. Having waited in vain, we shall put on record, as a matter of history, the facts in as brief a manner as possible, and make only such explanations as may seem to be necessary for correctly understanding the figures.

The Pharmacopœia Convention of 1880 instructed the Committee of Revision to award the publication of the Pharmacopœia to the publishing house offering the *best terms;* the committee to hold the copyright; the price of the book to be limited, and the book to be sold *through the ordinary trade channels.* A sub-committee on copyright was appointed by the Chairman of the Committee of Revision, comprising the Finance Committee, Drs. Rob. Amory, E. L. Wood, and Thos. Doliber, of Boston, and in addition, Dr. H. G. Piffard, of New York, and Dr. W. S. W. Ruschenberger, of Philadelphia; the latter, for domestic reasons, was unable to attend the meetings. In the draft of a contract the clause "to be sold through the ordinary trade channels" was not inserted, but in its place it was stipulated that the market shall be kept fully supplied. Nearly all the members of the committee regarded the two sentences as equivalent, and voted in favor of the draft, which also contained various blanks, one of the most important of which was the price at which the book was to be sold. The Committee on Copyright fixed the price at $4, and invited bids, which were received as follows:

Houghton, Mifflin & Co., Boston, royalty offered, one-half the profits.
Hall & Whiting, Boston: 15 per cent. on 15,000 copies in first year; afterwards 20 per cent.
Wm. Wood & Co., New York: 10 per cent., first year's guarantee on 10,000 copies.
J. B. Lippincott & Co., Philadelphia: 41 per cent., first year's guarantee on 2,000 copies.

		or 34 per cent.,	"	"	"	" 5,000	"
H. C. Lea's Son & Co.,	"	30½ per cent.,	"	"	"	" 4,000	"
P. Blakiston,	"	26 per cent.,	"	"	"	" 3,000	"

The sub-committee awarded the contract to Wm. Wood & Co., and in informing the general committee merely stated the names of the bidders, and that the successful firm had offered 10 per cent. royalty, but requested permission to withhold information as to the guarantee for the first year, nor did they furnish any details as to the other bids, until after several members of the general committee obtained the facts from the different firms. The contract was finally approved by the following vote:

Ayes—R. Amory, Mass.; P. W. Bedford, N. Y.; F. A. Castle, N. Y.; T. Doliber, Mass.; L. Johnson, N. Y.; J. F. Judge, O.; G. F. H. Markoe, Mass.; O. Oldberg, Mo.; H. P. Parsons, N. Y.; H. G. Piffard, N. Y.; A. B. Prescott, Mich.; C. Rice, N. Y.; O. A. Wall, Mo.; E. S. Wood, Mass., and T. F. Wood, N. C.—15.

Nays—C. L. Diehl, Ky.; L. Dohme, Md.; D. L. Huntingdon, D. C.; J. M. Maisch, Pa.; J. P. Remington, Pa.; W. S. W. Ruschenberger, Pa.; E. Scheffer, Ky.; A. B. Taylor, Pa., and W. S. Thompson, D. C.—9.

Why the committee adjudged that particular bid to be *the best* remains a mystery to the present day. It cannot be on the ground of the royalty offered for the *largest number of copies* during the first year; for in this

respect Hall & Whiting were 4,000 copies ahead of Wm. Wood & Co. It can also not be on account of the *largest sum* derived from the royalty of the first year; for against $4,400 from Wm. Wood & Co. this would have yielded from Hall & Whiting, $9,000; J. B. Lippincott & Co. (34 per cent.), $6,800; H. C. Lea's Son & Co., $4,880, which sums equal respectively 22,500, 17,000, and 12,400 copies during the first year at the royalty of Wm. Wood & Co.

It is estimated that the total sales of the Pharmacopœia previous to the next revision will be from 15,000 to 20,000 copies. The total difference in royalty can be easily calculated, when it is remembered that Wm. Wood & Co. pay on each copy 40 cents, while Hall & Whiting offered 60 cents, P. Blakiston $1.04, H.C. Lea's Son & Co. $1.22, J. B. Lippincott & Co. $1.36 or $1.64.

But there is still another aspect to this transaction. The price has been fixed at an unusually high figure. Hall & Whiting therefore suggested in connection with their bid, that the retail price should be $3.75, *at the highest.* H. C. Lea's Son & Co. submitted, in sealed envelopes, two additional bids, based upon a retail price respectively of $3.50 and $3.00, which bids were not considered. The unusually high price of the book is most forcibly illustrated by the following letter addressed to Dr. Amory, the chairman of the sub-committee, in explanation or the bid of Houghton, Mifflin & Co.: "If the book had been placed at $4, with the usual 25 per cent. discount to the trade, our bid would have netted the Association (*i. e.*, the committee) a dollar a copy for each copy sold, and, as I estimated yesterday, if there were ten thousand copies sold, which I thought a reasonable number, it would have given them $10,000 the first year." In other words, the cost of getting up the first 10,000 copies averages $1 per copy; the trade discount on the retail price of $4 is $1, leaving a clear profit of $2 on each copy sold. The chairman of the sub-committee adds, in Circular No. 133, that "these explanations were not given until Friday, the 13th" (Thursday, April 13?), and that therefore the sub-committee cannot be taken to task for not being able to have taken advantage of Mr. Houghton's offer."

Further comments appear to be unnecessary.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Pharmacopœia of the United States of America. Sixth Decennial Revision. By authority of the National Convention for Revising the Pharmacopœia, held at Washington, A. D. 1880. New York: Wm. Wood & Co.. 8vo, pp. 520.

In announcing the appearance of this work due praise should be accorded to the untiring and well-directed labor performed by the Chairman of the Committee of Revision, Dr. Chas. Rice, of New York, which alone made the early publication possible, through systematizing the work performed by the individual contributors.

A critical review of the Pharmacopœia would at the present time be premature, since for many of the formulas the experience of the apothecary will be required before their possible defects may become known. We

shall content ourselves now merely to direct attention to the more important changes.

The division of the old Pharmacopœia into a primary and secondary list of drugs, and into preparations, has been abolished, and a single alphabetical arrangement adopted, similar to that of the British Pharmacopœia, and except in nomenclature to that of nearly all the European Pharmacopœias. The drugs derived of the vegetable and animal kingdom are now concisely described as to their physical, and, wherever it was deemed necessary, also their important structural or chemical characteristics.

Processes for preparing chemical compounds have been omitted, except in a few cases; but each chemical is defined according to its formula, its physical properties, chemical reactions and possible impurities or adulterations.

In the formulas for pharmaceutical preparations definite quantities have been discarded, except where necessary on account of the dose, as for the preparation of pills, the quantities being given in grains and grams; for citrate of magnesium, in grains and grams, fluidounces and cubic centimeters; for fluid extracts, in grams and cubic centimeters, etc. The change made in the last-named case we consider as particularly inopportune, inasmuch as it differs from the general plan of the work to make all preparations by weight, and as it introduces a new relation of weight to measure hitherto unknown in American pharmacy; in our opinion, these preparations could have been easily and conveniently made to represent the drug weight for weight; but if a definite and uniform relation of weight to measure was considered absolutely necessary, it would have been far better to leave the old relation undisturbed, instead of adopting a measure which, if the discarding of measures be found of the convenience and exactness that is claimed for it, must necessarily involve another change in the near future.

Pending the general introduction and use of the metric system, American pharmacy must necessarily be in a state of transition, which has been recognized in the formulas for pills, where grains and their equivalents in grams are given, but discarded in those for fluid extracts where only gram weights are given for solids and liquids, except that the final product is to measure so many cubic centimeters. The present fluid extracts are about 5 per cent. weaker than those of the last Pharmacopœia.

Considering the fact that the spelling of the metric unit of weight, *gram*, is steadily gaining ground in England, we can now, less than heretofore, approve of the determination of the majority of the committee to make it *gramme*. Our preceding volume contains five or six papers presenting the arguments for both forms of orthography.

The practice so long adhered to in the United States of terminating the names of the organic alkaloids in *ia* or *ina* has met with little favor elsewhere, and even here it was not followed consistently. The Pharmacopœial plan of making the Latin names of the alkaloids ending in *ina*, and the English names in *ine*, and the names of the neutral or rather non-alkaloidal principles, respectively, in *inum* and *in*, is a very commendable one.

The Pharmacopœia proper is followed by a list of reagents and various tables, several of which have no relation whatever to the Pharmacopœia as a *law book*, no matter how convenient they may be for reference. One of the most important and necessary tables is that on pp. 454, 455, giving approximately the differences of strength of the more important preparations of the last and present Pharmacopœia.

We hope at an early date to enter more minutely into the merits of the different preparations, and solicit from our readers communications giving their experience with the working formulas and other matters of the new Pharmacopœia, which we hope will without delay become the guide in matters pharmaceutical throughout the country. In this connection we wish to state our regret that none of the members of the Committee of Revision thought of it in time before the book was placed upon the market to issue it with the recommendation that it be generally adopted for the dispensing of medicine *from a definite time*, say January or March 1, 1883. We would suggest that such a course be agreed upon after a new revision.

Pharmacopœa Germanica. Editio altera. Berolini: Apud R. de Decker (Marquardt & Schenck), 1882. 8vo, pp. 366.

The German Pharmacopœia. Second edition.

By the Chancellor's edict of July 8, 1882, the use of this new Pharmacopœia, which is published in the Latin language, becomes obligatory throughout the German Empire from January 1st next. The general arrangement remains the same as in the previous edition; obsolete drugs have been dismissed and new ones introduced. The descriptions of crude drugs are concise and the tests brief and to the point; the same may also be said of the chemicals. The galenical preparations are in the main made as heretofore; wherever extraction is necessary, it is performed by maceration, not by percolation, as with us. The directions are, as a rule, quite brief, and it is not considered necessary to enter so minutely into the details of the different processes as is customary in our Pharmacopœia. The formulas are partly (most syrups) constructed upon 100 parts of finished product; but in other classes of galenicals, like ointments, tinctures, species, wines, etc., this plan has not been followed, though in many cases the values given are easily convertible into 100 parts of the finished preparation (ointments and species), or of the menstruum (tinctures, wines).

In future numbers we propose giving the more important formulas of this, compared with similar ones of our new Pharmacopœia.

A Guide to Therapeutics and Materia Medica. By Robert Farquharson, M.D., Edin., etc. Third American edition, revised by the author. Enlarged and adapted to the U. S. Pharmacopœia, by Frank Woodward, M.D., Physician to the German Hospital Philadelphia. Philadelphia: Henry C. Lea's Son & Co., 1882. Royal 12mo, pp. 526.

As a convenient and reliable work of reference this "Guide" is duly appreciated by physicians, two editions having been exhausted within five years. The general plan and internal arrangement has been preserved in the present edition, and much care has evidently been bestowed upon it,

both by the author and editor. That its external appearance is in keeping with its valuable contents needs scarcely be mentioned.

The alphabetical list of drugs is followed by a smaller one, covering 32 pages, and embracing drugs which we think should have been included in the first list, because nearly all are recognized by the British and by the last or present United States Pharmacopœia. We notice with pleasure that the chemically incorrect name, propylamine, which is still largely used in prescriptions, has been discarded in favor of the correct name, trimethylamine; but we are rather surprised that on page 458 a secret preparation is noticed.

On page 188 it is stated that tea, coffee, guarana and *coca* contain caffeine; in place of the latter *maté* should have been mentioned. On page 148 the statement of former editions is repeated, that angustura bark "has fallen into disrepute from the fact that it was occasionally found to be accidentally adulterated or mixed with nux vomica bark." We have pointed out before ("Am. Jour. Phar.," 1879, p 334) that this is erroneous, there being but one substitution on record, dating back to the beginning of the present century. Perhaps the author had in view the false angustura bark which we described in 1874 (*ibid.*, 1874, p. 50), and which Oberlin and Schlagdenhauffen (*ibid.*, p. 414) subsequently proved to have been obtained from Esenbeckia febrifuga, *Martius;* but though this bark has a slight resemblance to the nux vomica bark, and, like the latter, is not aromatic, but bitter, it is not poisonous, but is or has been used throughout France in place of true angustura bark.

Rheumatism, Gout and some Allied Disorders. By Morris Longstreth, M.D., one of the attending physicians of the Philadelphia Hospital, etc. New York: Wm. Wood & Co., 1882. 8vo, pp. 280.

This forms the tenth volume of the current series of Wood's Library of Standard Medical Authors, and treats exhaustively of the diseases mentioned on the title-page, describing their varieties, causes, pathology, complications, morbid anatomy, diagnosis, prognosis and treatment.

The Medical Record Visiting List or Physicians' Diary for 1883. New York: Wm. Wood & Co.

It contains lists of doses for internal and subcutaneous use, and for inhalation, notes on disinfectants and antiseptics, on urinary analysis, on antidotes to poisons, etc.

Proceedings of the First Annual Session of the Alabama Pharmaceutical Association, held at Mobile, May 8. 8vo, p. 19.

Proceedings of the Twelfth Annual Meeting of the New Jersey Pharmaceutical Association, held in Atlantic City, May 17 and 18, 1882. Camden, N. J. 8vo, pp. 106.

Proceedings of the Wisconsin Pharmaceutical Association, held in Oshkosh, Aug. 8, 9 and 10, 1882. Third Annual Meeting. Janesville. 8vo, pp. 79.

Brief accounts of these meetings will be found on pages 326, 329 and 474 of the present volume. The second pamphlet contains an excellent phototype portrait of the late Chas. H. Dalrymple; and to the last is appended the first report of the Wisconsin State Board of Pharmacy.

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